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# The Relationship
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# SOME HÆMOLYTIC DISORDERS TO PERNICIOUS ANÆMIA.

BY P. N. PANTON, M.B., B.CH. CAMB.,
DIRECTOR OF HALE CLINICAL LABORATORIES;
A. G. MAITLAND-JONES, M.D., M.R.C.P. LOND.,
SECOND ASSISTANT, MEDICAL UNIT, LONDON HOSPITAL;
AND
GEORGE RIDDOCH, M.D. ABERD., M.R.C.P. LOND.,
FIRST ASSISTANT, MEDICAL UNIT, LONDON HOSPITAL.

*(From the Medical Unit and Clinical Laboratories of the London Hospital.)*

THE object of this paper, which is supplementary to one previously published by us in THE LANCET,[1,2] is to call attention to some examples of obscure hæmolytic disorders and to discuss their relationship to pernicious anæmia. Some of them present rare and hitherto almost undescribed conditions. All appear to have the common factor of internal hæmolysis, but since they differ in other respects we present them in a short series of small groups.

## EVIDENCE OF INTERNAL HÆMOLYSIS IN PERNICIOUS ANÆMIA.

It is important at this stage to state the evidence on which we assume that internal hæmolysis takes place in pernicious anæmia and the morbid states we are about to consider. We realise that as yet proof of internal hæmolysis in pernicious anæmia does not rest on an entirely satisfactory basis and we hope later to put it to experimental test; but for the present we accept it as a working hypothesis.

The generally accepted evidence for this view is the serious diminution of red cells, in the absence of external blood loss, associated with signs of greatly increased red cell formation as shown by hyperplasia of the red marrow and the presence of abnormal and immature red cells in the peripheral circulation. Additional evidence is afforded by increased pigment excretion in the urine, coloration of the blood serum, the deposition of free iron in the viscera, splenic enlargement, and red-cell phagocytosis. The interpretation of these data as evidence of internal hæmolysis has received some experimental support. Bunting [3] found that in rabbits anæmia secondary to severe and repeated hæmorrhages was accompanied by the blood and bone marrow picture of secondary anæmia, but that if the circulating red cells were attacked by a hæmolytic toxin, ricin, or saponin, the changes produced in the blood and red marrow were similar to those of pernicious anæmia. Bunting favoured the view that the circulating toxin acted upon both the red cells and the marrow. McMaster [9] and Haessler, however, found that if rabbits were repeatedly bled and at the same time given subcutaneous injections of hæmoglobin the resultant anæmia was accompanied by marked proliferation of the red marrow, and they concluded that the factor determining this proliferation was the presence in the body of hæmoglobin, or its precursors, in excess of the amount which could be utilised by the marrow already existing.

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### *First Group.*

The first group of cases comprises two, the main features of which are the blood changes of pernicious anæmia, jaundice, and hæmoglobinuria.

CASE 1.—A dock labourer, aged 33, became an in-patient at the London Hospital in December, 1905. Two years and eight months previously he had begun to feel tired and languid, and five months previously had passed what he took to be blood in his urine. This apparent hæmaturia was repeated a few days later, and he was admitted to St. Bartholomew's Hospital, where a diagnosis of "jaundice and hæmoglobinuria" was made. The hæmoglobinuria soon ceased and the patient, having improved, was discharged. About three months later his weakness returned and he was admitted to the London Hospital. On examination the skin was lemon-tinted, the spleen was felt three fingers-breadth below the costal margin, and his temperature was raised to between 101° and 103° F.; there was marked pyorrhœa and no wasting. Whilst in hospital the patient had an attack of hæmoglobinuria with no relation to cold, which was followed by sudden pain in the chest and hæmoptysis suggestive of pulmonary infarction. This again was followed by thrombosis in the right posterior tibial and left internal saphenous veins. During the following three to four years this patient was admitted to the London Hospital altogether on five occasions. During the intervals between the admissions he returned to his work. In February, 1909, he was seen by one of us for the first time and his blood on examination gave the following readings: Red cells 1,321,000 per c.mm., colour index 0·9, marked morphological changes in the red cells with numerous megaloblasts and a relative lymphocytosis. The patient was obviously jaundiced and the serum contained bile pigment. The urine was of a port-wine colour with a deposit of golden-brown pigment and hæmolysed red cells, and showed the spectrum of oxyhæmoglobin. The Wassermann reaction (W.R.) was negative.

This patient was examined by one of us on several occasions during his remissions and while engaged upon his work as a dock labourer. During all this time he was strikingly anæmic, with a hæmoglobin percentage of about 20. Admitted for the last time in January, 1910, with a sore throat and an exacerabtion of oral sepsis, his general condition and blood state were found to be much the same. But acute septicæmia developed and the patient died. Post mortem, the characteristic changes of pernicious anæmia were found in addition to those of acute sepsis.

CASE 2.—A bricklayer, aged 38, was admitted with an apparently similar condition into the London Hospital in June, 1918. He gave an eleven years' history of anæmia and eight years' history of periodic attacks of hæmoglobinuria, which occurred without exposure to cold. Examined on admission, this patient was a well-developed muscular man, very anæmic and slightly jaundiced; he stated that he became jaundiced whenever his urine became red, which occurred about once every four to eight weeks. The spleen was not palpable. Whilst in hospital he developed thrombosis of his right median basilic and cephalic veins. His urine contained hæmoglobin and granular casts, but no red cells. No attack of severe hæmoglobinuria occurred during his stay in hospital. The serum was tinged with bile, and examination of the blood gave the following readings: Red cells 1,150,000 per c.mm., colour index 0·9, marked morphological changes in the red cells with many megaloblasts; there was also a leucopenia of 2600 cells per c.mm. with a relative lymphocytosis. The fragility of the red cells was normal and the W.R. negative. This patient was discharged after a month's stay in hospital and died two years later, after constant ill-health and inability to do any work. No post-mortem examination was carried out.

It is evident that these two patients were strikingly similar, in that they were males of about the same age with a clinical condition and blood state suggestive of pernicious anæmia, but differing from it in the following points: The occurrence of attacks of hæmoglobinuria and thrombus formation in superficial veins, the presence of marked jaundice, which is a very rare event in pernicious anæmia, and the long duration of the illness, 8 years and 13 years respectively.

The question arises as to the category in which these two cases are to be placed. Are they examples of so-called paroxysmal hæmoglobinuria or of pernicious anæmia with hæmoglobinuria? With regard to the first alternative, it has been our experience that in paroxysmal hæmoglobinuria, alterations in the blood count other than those of a possible slight secondary anæmia are not found. With regard to the second alternative, the history and clinical state in these two cases differed, as has just been mentioned, from those in pernicious anæmia, and further the occurrence of hæmoglobinuria in this disorder is extremely rare; we have been able to find in the literature only one reference[8] to its presence, although Minot [10] refers to it as occurring occasionally.

There is a third possibility. Are these two patients examples of the acquired form of hæmolytic icterus with hæmoglobinuria occurring during the hæmolytic phases? Various examples of this condition have been recorded, and lately Giffin [4] has described under

the title of "Hæmoglobinuria in Hæmolytic Jaundice" a case which resembles to a considerable extent the two cases we have described above. Giffin considered his case, a woman of 32, to be an example of hæmolytic jaundice, but in the absence of splenic enlargement or of any familial history of the condition the diagnosis rested mainly on two estimations of the red cell fragility. On both occasions hæmolysis commenced at 0·5 per cent. saline as contrasted with a normal at 0·42 per cent. The red cell changes resembled those of pernicious anæmia. We should consider the red cell fragility in Giffin's case as less marked than is the rule in typical examples of hæmolytic icterus, and the same criticism applies to other cases quoted by Giffin in his article. In one of our cases in which the fragility was examined it was found to be normal. We revert later to the relationship between pernicious anæmia and hæmolytic icterus, as well as to the difficulty in distinguishing between occasional atypical cases which appear to occupy a position intermediate between the two conditions. For the present we prefer to place the two cases here described in a separate category.

The difference, however, between this condition and pernicious anæmia is apparently one of degree only, the phases of slow blood destruction responsible for the relapses of pernicious anæmia being accentuated by short sharp bursts of blood destruction in which the quantity of hæmoglobin liberated is so large that it is excreted as such in the urine.

*Second Group.*

The second group of cases concerns two subjects of arseniuretted hydrogen gas poisoning observed by us. $AsH_3$ is a well-recognised agent of internal hæmolysis and there was no doubt as to the diagnosis in these cases, but they are included here because of the strong clinical resemblance which they bear to the preceding group.

CASES 3 and 4.—Two men employed in a chemical works, their duty being to supervise a mixture of zinc and sulphuric acid in an open vessel. Both these materials were subsequently found to contain arsenic, which in the sulphuric acid amounted to 0·066 per cent. Shortly after leaving work on one occasion both men had sudden epigastric pain, vomited, and passed urine like blood. On examination two days later they were found to be drowsy, delirious, markedly jaundiced, and profoundly anæmic. The urine contained a large amount of hæmoglobin. The blood showed the red cell and hæmoglobin changes of pernicious anæmia, both normoblasts and megaloblasts being present. Bile pigment was present in the blood, but not in the urine. Both patients made a rapid and uneventful recovery. On admission they stated that they were employed at a lead works, but the association of jaundice, anæmia of the primary type, and hæmoglobinuria was sufficiently indicative of the cause of their condition.

Such cases, though well known to occur, are rarely met with in the practice of the London Hospital. They serve as a valuable object-lesson of the effect of inhaling a powerful and rapidly acting hæmolytic poison.

*Third Group.*

The third group is represented by one case, the detailed account of which is in course of publication by one of us in conjunction with Dr. J. H. Sequeira. We give an outline of the more important points.

CASE 5.—A butcher, aged 32, first seen by one of us in 1910, giving one year's history of skin irritation, worse on exposure to cold, and six months' history of a rash and loss of hair. On admission to the London Hospital the skin of the limbs and trunk was black, the colour of a negro's. The face and hands were a dark yellowish brown. The patient was quite bald. The blood state was that of pernicious anæmia with 1,530,000 red cells per c.mm., hæmoglobin 28 per cent., and colour index 0·9. Numerous normoblasts and megaloblasts were present. The urine was normal and, with the exception of well-marked oral sepsis, no other physical signs of disease were found. Previous to this illness the patient described himself as a perfectly healthy man. No drugs, such as arsenic or silver, had been given him by his doctor. The patient was given arsacetin, and during the next month his blood condition was that of an improving case of pernicious anæmia. The blood continued to improve, but reverted to the secondary anæmic type, the count four months later being 4,350,000 red cells per c.mm., with a colour index of 0·5 and very occasional normoblasts were found. During this period the colour of the skin became markedly lighter.

The patient was readmitted for observation in 1921 and again in 1922. Since 1910 he has suffered from anæmia to a degree which has prevented him from following his occupation. His appearance has entirely altered and he does not suffer from any skin irritation. He may now be described as a grey-haired lemon-tinted man. In 1921 his blood showed a severe anæmia with a low colour index of about 0·5 and numerous normoblasts on several examinations. In 1922 the colour index was again usually low but varied (0·27 to 0·71), and the red cell changes were extreme. On one occasion 322 normoblasts and 13 megaloblasts were seen while counting 200 leucocytes (white cells 5800 per c.mm.) The patient is still alive and apparently in much the same condition.

We would describe this man as an example of severe internal hæmolysis of very long duration—from 1910 to 1923—in which the broken-down blood pigment instead of being deposited in the internal viscera as in pernicious anæmia, or voided in the urine as in the previous group of cases, is stored in the skin—at any rate in part. This abnormality in pigment distribution is associated with a hæmolytic process of extreme chronicity suggesting that we are considering here a condition allied to, but differing from, pernicious anæmia.

The syndrome exemplified by this patient appears to be of great rarity and unlike that of hæmochromatosis associated with diabetes. Mosse,[11] in a paper dealing with melanosis of the skin in pernicious anæmia, recently described a somewhat similar case in a woman, but in his case, which was of an acute type, he came to the conclusion that the pigmentation was arsenical. In Case 5 arsenic as a cause was investigated and excluded.

*Fourth Group.*

The fourth group comprises a variety of conditions usually classified under the term of "paroxysmal hæmoglobinuria." We describe here two examples only:—

CASE 6.—A wood carver, aged 17 years, was admitted to the London Hospital in 1912 with a six months' history of pain in the back and a seven weeks' history of "blood" in the urine appearing only after exercise and disappearing when he lay down. The urine passed by the patient when lying down was perfectly normal, but after he stood up it contained a heavy cloud of albumin. After he took half an hour's walk it became claret-coloured, gave a marked guaiac reaction, presented the spectrum of oxyhæmoglobin, and deposited a heavy sediment of broken-up red cells. The patient's serum was of normal colour in the intervals between the attacks, but during the attacks was faintly tinged with hæmoglobin. The sequence of events leading up to hæmoglobinuria did not seem to be in any way dependent upon exposure to cold, but was proved on several occasions to follow upon exertion. The erect posture led to the passage of albumin, mild walking exercise to a mild degree of hæmoglobinuria, and more strenuous walking exercise to severe hæmoglobinuria with the passage of porter-coloured urine. The W.R. was tested on several occasions and was either negative or incompletely so. The boy had no other physical signs of disease and no stigmata of congenital syphilis. The blood count showed a mild degree of anæmia with a slight inflammatory leucocytosis. The patient was given 10 c.cm. of horse serum subcutaneously and the following day walked for two miles. His urine at the end remained clear and free from albumin. Three days later the hæmoglobinuria returned after exercise and 10 c.cm. more serum was given. The urine again remained clear after exercise, but after a period the patient relapsed again. Four injections of horse serum were given altogether, and after the final injection the patient was observed over a period of several weeks, during which he took sufficient walking exercise to wear out his boots, and except for the very occasional presence of a slight amount of albumin the urine remained normal. No further treatment had been given, and now, 11 years later, the patient is perfectly well and has been free from attacks in the interval.

The points of interest in this case are the suggested relationship between the postural albuminuria of adolescence and paroxysmal hæmoglobinuria, the definite dependence of the attack upon exercise and not upon exposure to cold, the probable absence of a syphilitic origin, and the cure, first temporary and finally complete, consequent upon the injection of horse serum.

The second example of the fourth group is described mainly as a contrast to the first.

CASE 7.—A Jew, aged 40, was quite well up to the age of 31, when he married; during his honeymoon he passed "blood" in his urine for the first time. He had several mild attacks of this nature and five years later, after bathing, he got a severe attack of hæmoglobinuria, followed by deep jaundice which lasted for several days. During the next four years he experienced numerous severe attacks of the same nature and always after exposure to cold. On examination during an attack his urine was the colour of porter, and contained methæmoglobin and the débris of red cells. He was deeply jaundiced and his serum was strongly bile-tinged. His blood showed a very mild degree of anæmia with a slight inflammatory leucocytosis and the fragility of his red cells was normal. He denied syphilitic infection, but his W.R. was unfortunately not obtained. Treatment with horse serum had no beneficial effect.

This man presented the more usual type of hæmoglobinuria definitely associated with exposure to cold in contrast to the previous case in which the attacks followed exercise in the erect posture. Case 6 was given horse serum on the supposition that some inhibitory substance, which might in normal man prevent the possible hæmolytic action of the chemical products of muscular activity, was absent in his case. Whether the supposition was right or wrong the result of giving the horse serum was dramatically successful. In Case 7 the serum was quite ineffective.

Paroxysmal hæmoglobinuria is defined by Chester [7] and Basil Jones as "a chronic disease, due to syphilitic infection, manifesting itself in recurrent paroxysms of hæmoglobinuria and in characteristic constitutional symptoms. The blood of patients who suffer with this disease contains in latent form a specific hæmolysin which becomes active when the blood is chilled and produces the attacks." In a recent article Hannema[5] and Rytma have described the reaction of Donarth and Landsteiner by which hæmolysis is brought about on exposure of the red cells to ice-box temperature. They also mention the experiments of Hymans van der Bergh and Hymans showing the influence of a carbonic acid gas atmosphere in favouring hæmolysis, and the later work of Widal, Abram, and Brissaud on the mechanism of the hæmolytic process in paroxysmal hæmoglobinuria.

But while something has been learnt of the hæmolytic process in these rare states, it is probable, and the two cases which we describe strengthen the probability, that the agent involved may vary in the different cases met with and that the underlying syphilitic factor may not be constant. However this may be, the usual type of paroxysmal hæmoglobinuria following remotely upon syphilis and nearly upon exposure to cold bears little resemblance to the usual type of pernicious anæmia. Yet the first group of cases (Nos. 1 and 2) described in this paper provide examples as near as may be intermediate between the two conditions, and in considering one state of internal hæmolysis it is necessary to consider other conditions associated with the same process. It does not, however, appear to us probable that the essential underlying factors in pernicious anæmia and paroxysmal hæmoglobinuria are in any sense identical.

*Fifth Group.*

The fifth group is represented by only one case.

CASE 8.—A chauffeur, aged 33, admitted to the London Hospital in February, 1922, with the history that he was quite well up to 12 years before admission. He then began to feel weak and noticed that his colour became yellow. After continuing more or less in this state for four years he was admitted to a hospital in London, yellow tinged and with a palpable spleen. Splenectomy was performed for "acholuric jaundice." The fragility of the patient's red cells was stated to be normal before and to be increased after operation. He said that after the operation he lost his yellow colour and was quite well for three years, except that every summer he felt a little weak and languid. At the end of the three years he again became yellow, and periodic attacks of sore tongue occurred, usually in the summer months. A year after the return of his symptoms he began to have difficulty in walking, which gradually got worse, so that a year before he came under our observation in the London Hospital he was bed-ridden and had lost control over his bladder and rectum.

On examination after his admission to the London Hospital this patient was a well-nourished man with a lemon-yellow tint. His heart and lungs were normal, and beyond the scar of his operation the abdomen was also normal. He complained of persistent numbness in his upper and lower limbs, most marked in the feet and hands. He was intelligent without any obvious mental abnormalities. His fundi and cranial nerves were normal. His upper limbs showed no weakness, local wasting, or disturbance of tone, but they were slightly ataxic. There was marked weakness of his lower limbs with wasting, especially below the knees, and gross ataxia. Tone was not apparently affected. Biceps-jerks were brisk and equal, knee-jerks present and equal, and ankle-jerks absent, while his plantar responses were extensor. Sensibility to cottonwool and to pin-prick was diminished over both lower limbs, but elsewhere was perfect. Postural sensibility was greatly diminished in the toes of both feet and to a slight extent in the fingers of both hands. There was frequency of micturition with defective control over the bladder and bowel.

Repeated examinations of his blood showed, during his six months' stay in the London Hospital, gross anæmia, the red cells varying from 600,000 per c.mm. to 3,000,000 per c.mm., with a high colour-index varying from 0·8 to 1·1. There were extreme morphological changes in the red cells and megaloblasts were very numerous. The serum was bile-tinged, but the resistance of the red cells to hæmolysis was normal. A fractional test-meal showed a complete absence of HCl and the W.R. in the blood was negative. The patient stated that his mother had five sisters and two brothers; one of the former had an enlarged spleen, was yellow, and died at an early age; and another died of "pernicious anæmia." In addition, one of his mother's brothers was admitted to the Prince of Wales's Hospital, where a diagnosis of "pernicious anæmia" was made and confirmed by the blood picture.

On his discharge from the London Hospital he was transferred to a local infirmary, where he died 16 months later and about 14 years after the onset of his illness. A post-mortem examination was not obtained.

The diagnosis in this case would appear to rest between pernicious anæmia and acholuric jaundice, and if we confine ourselves to these alternatives the evidence favours that of pernicious anæmia. The normal fragility of the red cells, the typical blood count, the achylia, the presence of subacute combined degeneration of the cord, and the history of a sore tongue all support this view. The most striking feature in the case and the one which raises any doubt in the question of diagnosis is the occurrence of three other examples of the same condition in the family. Familial pernicious anæmia has been recorded by Bartlett,[2] Patch,[13] and Minot [10] and, though rare, seems well established.

The familial occurrence of pernicious anæmia appears to us of the greatest importance in any consideration of the ætiology of the condition. A familial incidence places before us two alternatives in regard to ætiology. Either we have to consider the familial type as being due to a different cause, or we have to find a cause capable of producing the disorder in more than one member of the same family. The first alternative, that the familial type has a different ætiology, receives some support from a consideration of the case described here, in that certain features usually absent in pernicious anæmia were present—namely, jaundice, enlargement of the spleen sufficient to suggest splenectomy, advanced cord changes,* and a very chronic course of some 14 years. Any one of these features may be present in pernicious anæmia, but none of them commonly, and the combination of them added to the familial history suggests a different ætiology in the familial variety.

The other alternative—to find a satisfactory ætiological explanation for the occurrence of the disorder either in a single individual or in more than one member of the same family—presents great difficulties. The most popular conception of the ætiology of pernicious anæmia is that a hæmolytic poison is manufactured in the intestinal tract as the result of abnormal bacterial action. This might result from either the entry of abnormal bacteria or an upset of the balance of the normal intestinal flora.

* The relationship of subacute combined degeneration of the cord to pernicious anæmia is being made the subject of a special study, the results of which we hope to publish in the near future.

If the former explanation is adopted, it is difficult, if not impossible, to understand why contacts, other than members of the family, should not sometimes develop pernicious anæmia. The second explanation is attractive, and presupposes as its essential basis some persistent alteration, congenital or acquired, in the bacterial environment. It has been claimed that achylia is the primary abnormality in pernicious anæmia, and Hurst[6] has recently suggested that familial achylia, which is known to occur, is a complete explanation of the appearance of familial pernicious anæmia. But the observation, also quoted by Hurst, that 4 per cent. of normal individuals have achylia is strong evidence against this view; for the incidence of achylia in the general population being so high and that of pernicious anæmia so low the chances against any small group of individuals with achylia presenting three or more examples of pernicious anæmia would be so great as to imply that some other factor was involved.

Whatever the ætiology of pernicious anæmia may ultimately prove to be, the fact that the disorder is occasionally familial is suggestive, and a close study of members of affected families seems to be called for.

### HÆMOLYTIC ICTERUS AND APLASTIC ANÆMIA.

In addition to the small groups of disorders described here there are two conditions, of which we have seen several examples, and to which attention should be directed in any discussion upon the relationships of pernicious anæmia. We refer to hæmolytic icterus and aplastic anæmia. Although in both these states internal hæmolysis occurs, the important underlying factors in them—namely, the red cell fragility of hæmolytic icterus and the red marrow destruction of aplastic anæmia—are absent in pernicious anæmia. Yet, as we have seen, cases are met with in which the diagnosis between pernicious anæmia and hæmolytic icterus may be difficult, as in a case recently described by Parkes Weber.[15] In the last nine cases of hæmolytic icterus seen at the London Hospital the colour-index was 1·0 or over in one or more of the blood examinations made in eight cases, and 0·5 in one case. Nucleated red cells were present in four cases and in one case normoblasts were numerous and megaloblasts were also found. Such a blood picture closely resembling that of pernicious anæmia is only to be expected in cases of internal hæmolysis. Conversely the continued production of immature and imperfect cells in pernicious anæmia might lead to the appearance of fragile erythrocytes. The fragility of the red cells in pernicious anæmia is usually normal or less than normal, but we have occasionally found it to be slightly increased. The fragility of the red cells in hæmolytic icterus is usually very much greater than the normal, but occasionally the difference may not be marked, and in such cases the condition is, in our experience, more often the acquired form of hæmolytic icterus than the congenital and familial variety. We infer that although pernicious anæmia and hæmolytic icterus are different states, it may not always be easy or possible to distinguish them during life. Aplastic anæmia, as we have observed the condition when it follows poisoning by a known chemical agent, such as trinitrotoluene, presents a blood picture by which the disorder may readily be recognised. When the ætiological factor is unknown typical examples of the disorder may also be met with, but not infrequently states are found which appear to be intermediate between pernicious anæmia and aplastic anæmia. Such states may represent examples either of pernicious anæmia presenting a subnormal degree of marrow regeneration or of aplastic anæmia in which marrow destruction is less complete than usual and hæmolysis is more excessive.

### THE COMMON FACTOR OF INTERNAL HÆMOLYSIS.

As we have already stated, we, for the present, assume that internal hæmolysis is a pathological process common to all the disorders described in this paper, diverse though they are in many respects in their symptomatology and course. It is this feature which links them together and brings them into relationship with pernicious anæmia, because while the essential factor underlying this disorder is a subject of both conjecture and dispute, there is fairly general agreement that the predominant morbid process is destruction of red cells within the body.

The occurrence of this red cell destruction has, indeed, been recently called into question by certain workers, and notably by Ashby[1] and by Whipple.[16] Ashby puts forward the suggestion that the increased activity of the bone marrow in pernicious anæmia may be only apparent. She grants that the stimulus to red cell production causes an increase in the number of dividing cells, but she suggests that some factor is present which retards the rate of division, the net result being an increased red marrow area with a decreased cell output. Hæmosiderin deposition she regards as evidence only of failure to utilise sufficiently quickly the iron released in a normal rate of blood destruction.

Ashby's experimental evidence in support of this view was based on the results obtained from the transfusion of Group IV. blood into patients with pernicious anæmia belonging to other blood groups. The elimination of Group IV. corpuscles was watched by diluting the recipient's blood, after transfusion, with Group IV. serum and noting the number of corpuscles that remained unagglutinated. In four patients with pernicious anæmia examined over a long period by Ashby no evidence of rapid destruction of the transfused red cells was found. In two other patients, however, the elimination of the transfused blood appeared to be remarkably rapid.

Ashby's observations are, by the nature of the methods employed, subject to considerable experimental error. She appears to assume that the addition of Group IV. serum to blood of another group will agglutinate all of the red cells of that group, but this we have never observed to be the case. An examination of her protocols, moreover, shows that after a transfusion of only 500 c.cm. of Group IV. blood the foreign cells were estimated to form in many instances from one-fourth to almost the whole of the total cells. We have ourselves by means of large and frequently repeated transfusions raised the red cell content of a patient suffering from pernicious anæmia from under 1 million per c.mm. to approximately 5 millions in a fortnight. Yet two or three weeks later the red cell count was below 1 million again. The natural presumption is that the transfused red cells had been destroyed. In some of Ashby's cases the hæmolytic process was active during the period of observation, in others it was not and that is the common experience in this disorder.

Further criticisms of Ashby's deductions have been made by Wearn,[14] Warren, and Ames, and seem to be pertinent.

Whipple elaborates a novel scheme of normal pigment metabolism in which he suggests that possibly all pigment construction units pass through the stage of a "pigment complex" which is called upon either to construct hæmoglobin or bile pigment or to discharge urobilin or urochrome and that bile pigments are derived in part only from hæmoglobin. Whipple further suggests that a patient with pernicious anæmia having only one-fifth the normal number of red cells excretes twice or three times the normal amount of stercobilin, and that if stercobilin is a complete index of blood destruction the patient must regenerate his total red cell mass every three days instead of the supposed normal of 30 days.

Whipple prefers to explain the observed facts in pernicious anæmia by supposing an over-production of pigment associated with a deficiency or disorder of red cell stroma material, and he mentions hæmochromatosis as a condition in which no evidence of hæmolysis exists. But this does not appear to us to affect the question since it is not denied that an abnormal metabolism, retention, or distribution of pigment may occur without hæmolysis. Whipple's interesting paper is, as he himself points out, mainly speculative, and it appears to us to have more value as a contribution to pigment metabolism than as an

argument against increased destruction of red cells in pernicious anæmia.

That an increased production of pigment may occur in pernicious anæmia and that all the stercobilin in the fæces may not be derived from hæmoglobin is possible, but it seems to us to be more reasonable to account for the associated diminution of red cells in this disorder by the assumption of an increased red cell destruction for the reasons indicated by us at the commencement of this paper.

### EXPLANATION OF VARIED CLINICAL PICTURE.

But before internal hæmolysis can be accepted as the pathological process common to all the disorders here discussed it is necessary to offer a satisfactory explanation for the wide variation in the clinical pictures presented. This, indeed, is our main purpose in this paper and is an attempt to elucidate the mechanisms underlying the production of those abnormal blood states, usually regarded as distinct entities, in which, whatever their ætiology may be, destruction of the red cell or its precursor is the predominant feature. There are two processes that appear to us to be of great importance in determining the clinical picture.

(1) *The Main Incidence of the Lesion.*—When the site of the lesion is chiefly in the circulating blood the red cell is distorted or destroyed in its mature state and hæmoglobin is liberated. To compensate for this deficiency increased production of new red cells occurs, and if the destructive process is prolonged there is consequent proliferation of the red marrow. Examples are paroxysmal hæmoglobinuria, in which red cell destruction is of short duration, and pernicious anæmia, in which the process is more chronic. When the lesion lies mainly in the bone marrow its consequences are more serious, for parent and immature cells are destroyed with resulting diminished regenerative capacity corresponding in amount to the extent of the damage. These cells do not, of course, contain hæmoglobin, and hæmoglobinuria, icteric tinging of the skin, and deposition of free iron in the viscera are absent. This occurs in aplastic anæmia. It may happen, however, and probably not infrequently, that the destructive process is not so specific in its incidence, but either progresses simultaneously in the circulating blood and bone marrow, or begins in one situation and extends to the other. Inability to categorise certain cases as pernicious anæmia or aplastic anæmia is the occasional experience of most investigators. Another group is represented by hæmolytic icterus where at least one link in the pathological complex constituting the lesion seems to be a lowered resistance of the red cell stroma to abnormal noxious influences or ordinary wear and tear. This defect may be congenital or acquired.

(2) *Rapidity of the Pathological Process.*—A second important factor in determining the evolution of the complaint is the rate and duration of the destructive process. When the process is acute, as in arseniuretted hydrogen gas poisoning (Cases 3 and 4), all the phenomena of rapid red cell disintegration appear—drowsiness, delirium, jaundice, hæmoglobinuria, and profound anæmia. If the dose is sufficiently large the patient dies. A less severe although still acute effect is evident in paroxysmal hæmoglobinuria. In pernicious anæmia, on the other hand, the process is characteristically slow, but phases of more rapid destruction are common and account for the relapses. Sometimes these are acute and in Cases 1 and 2 the paroxysmal attacks of jaundice, hæmoglobinuria, and aggravation of the anæmia were doubtless due to sudden exacerbations of the destructive process. The obvious explanation of the prolonged course, sometimes lasting many years, in certain cases of pernicious anæmia is that red cell destruction is less extensive and unusually prolonged.

The patients, Nos. 2 and 6, described above, were admitted to the London Hospital under the care of Dr. Robert Hutchison, and we are much indebted to him for his help in their investigation.

(*Continued at foot of next column.*)

# THE METABOLIC CHANGES ASSOCIATED WITH X RAY AND RADIUM TREATMENT.

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THE chief interest at present in the consideration of the causation of radiation "sickness" or toxæmia centres on the more essential biochemical changes resulting from radiation. Many of the other factors which have been discussed can only be subsidiary or rarely operative, such as gas poisoning in X ray rooms, or high induced voltage of patients having X ray treatment. Psychical causes also can only be at work to a limited extent. But in temporary depression of the functions of the kidneys, or in a toxæmia from the definite organic products of proteolytic or autolytic changes (possibly anaphylactic), or in inorganic disturbance from acidosis or other metabolic changes, the essential causes are now being sought. It was the recent hypothesis of Andersen and Kohlmann that roentgen sickness is "like an acute uræmia," which prompted the following investigation, the results of which are here given in a greatly condensed form. It was felt that should the condition be anything "like an acute uræmia" a study of the basal metabolism would show definite and characteristic changes. If it proved not to be uræmic other characteristic changes might be found which would enable radiation sickness or toxæmia to be grouped with the analogous metabolic changes also producing "sickness" when present in sufficient intensity: anæsthesia, diabetic intoxication, pregnancy, protein poisoning, the toxæmia of fevers, migraine, uræmia, &c. Also by this means suitable preventive and curative treatment might be indicated.

### *Literature of the Subject.*

As to the clinical incidence of radiation toxæmia, of 160 cases noted by Miescher 60 per cent. showed no disturbance clinically; in the 40 per cent. which showed disturbance this was most marked when the radiation was on the epigastric area. Of 81 cases noted by Groedel and Lossen sickness was noted in every fourth case radiated on the head or neck, in every third case radiated on the thorax, and in every second abdominal case, their conclusion being that the "sickness" depends on the amount of glandular tissue radiated.

The literature on the different hypotheses and the clinical and experimental findings is already large.

(*Continued from previous column.*)

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The factor of gas poisoning has been suggested and worked at by Pfahler, Guthmann, and others. Rieder suggested the possibility of the induced high voltage of the patient's body during intensive X ray treatments. Edsall and Pemberton in 1907 put forward the view that the toxic products of nucleo-protein decomposition, which the kidneys were not able to excrete quickly, were the chief cause of the condition, which they regarded as an acute toxæmia. The white blood cell destruction may stimulate enzymes, especially autolytic ones. This aspect was reviewed by Richards in 1914–15. A degree of toxic nephritis has been suggested, causing a transitory uræmia, but, if present, this has not been of sufficient intensity experimentally to show definite histological changes. Proteoses can, however, depress the renal function for many hours to a quarter of the normal (Hall and Whipple).

Andersen and Kohlmann, as already noted, view the condition as similar to an acute uræmia; they find changes in the mineral content of the blood, in the calcium, sodium, and potassium content, the calcium being increased and potassium decreased at first, becoming normal again in 24 hours, the sodium being lessened for several days. They view roentgen sickness as vagus stimulation, causing altered blood mineral content, and they recommend calcium salts by mouth and intravenously for prophylaxis and in treatment of the established condition. Nürnberger found increased blood-sugar on the first and second days. Lange brought forward an acidosis hypothesis, which, as Sir Humphry Rolleston says in his recent masterly survey of the subject, has not received the attention it deserves. Observations on the point are few and contradictory. Denis, Aldrich, and Martin found acidosis in rabbits. Case found tests for acidosis negative. Golden found in patients and dogs no less alkali reserve, therefore no acidosis. Hussey found in rabbits increased alkali reserve 24 hours after. Lange recommended sodium bicarbonate treatment. The anaphylaxis view of Bergonié and others is apparently negatived by the fact that the reaction occurs as markedly after the first exposure as after later exposure. Also Hall and Whipple found in dogs rather an increased tolerance than otherwise with repeated exposures. Prendergrass and others, as a result of radium experiments on the brain, conclude that there is first a nuclear death, then the nerve cells are acted on by intracellular ferments, lecithin lipoids are broken up into neurin and cholin, and these when set free are autolytic causes of toxæmia. The chemical imitation of the effects of radiation by injection of cholin and enzytol (Werner) may here be mentioned. Autolytic changes in the intestinal epithelium have been specially noted by Hall and Whipple in their long series of experiments on dogs. The changes were very marked with massive fatal or sub-fatal doses, and were comparable with those found in acute hæmorrhagic pancreatitis or acute intestinal obstruction.

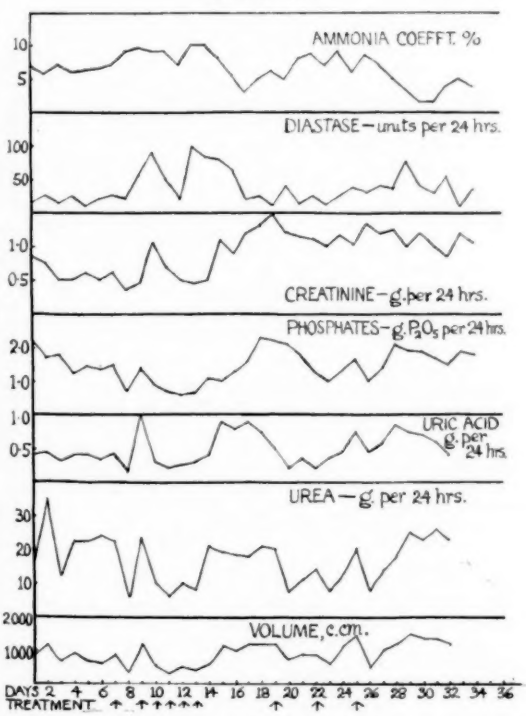
They regard X ray intoxication as similar to the intoxication after burns, due to toxic protein decomposition products. They found a latent period of 24 hours or longer, and a fourth-day maximum of toxic effect. They found no evidence of a true nephritis, and the chemical changes they noted were a 50–75 per cent. increase in the urinary nitrogen, increased purin bases, and phosphorus radicles. The non-protein nitrogen in the blood was two to three times the normal. On the whole, however, they found no very constant alteration in the blood as regards urea-nitrogen, total non-protein nitrogen, uric acid, creatinine, or sugar. But the chief difference from the normal they found was a deviation in the acid-base equilibrium, with increase in the hydrogen-ion concentration just after the treatment, and sometimes a slight lowering of the alkali reserve, and after 24 hours a diminished hydrogen-ion concentration and an increased alkali reserve. Whether this disturbance is comparable with the disturbance in fevers, &c., of the acid-base equilibrium remains for further research. Also as to its mechanism in irradiation it is not yet clear whether this change is due to alterations in the colloidal cell and serum equilibrium, as Hardy's experiments with acid and alkali globulin suggested, and as Colwell (quoted by Rolleston) has speculated. X and gamma radiation acting, so far as we understand, solely by the emission of negative beta-corpuscular radiation, might be expected to cause a transitory local and general increase in acid content. Thus would Lange's hypothesis of local and general acidosis find some support, as one aspect of the radiation effect.

A more complete study of the problems involved than is here attempted would inter-relate the clinical and technical variations more fully with the laboratory findings. Patients might be grouped as to the skin surface area radiation both in intensity and time, according to the depth or "volume dose," also to the site of radiation, such as glandular, splanchnic, or more indifferent areas, and again as to age, sex, &c.

### *The Present Investigation.*

Owing to the enormous amount of labour involved in investigating even a single case, our numbers are too small to enter into discussion on such points of

CHART 1.




Observations on Group 1, Case 1.

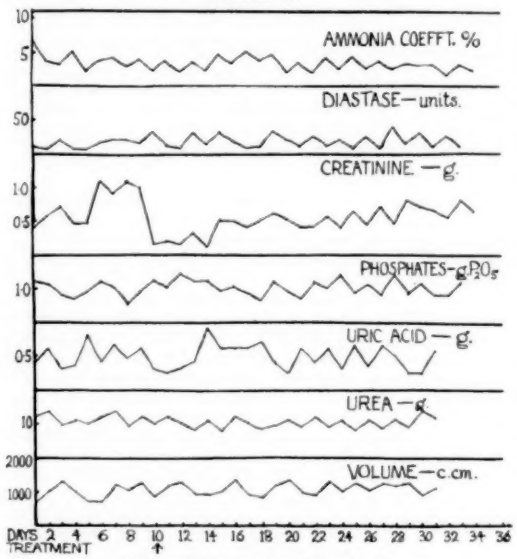
detail. The patients studied were from four clinical groups: (1) cases of leukæmia; (2) cases of exophthalmic goitre; (3) prophylactic post-operative radiation of breast cases; and (4) radiation of patients with malignant disease in various parts of the body. Cases in Group 1 were treated with radium to the enlarged spleen, with or without X radiation to the long bones or enlarged glands. The method of Ordway and Giffin was followed, with minor modifications, in using the radium. Cases in Group 2 were treated with X radiation to the thyroid (and thymus in some instances). A shorter X ray wave-length was used in a few of Group 3 cases and in all of Group 4 cases; thus a wide range of X and gamma wave-lengths was used.

In this preliminary investigation it was decided to confine our attention mainly to the urine, although some blood observations were made. The effect of

radium and X rays on human subjects is a very difficult matter to investigate. Since it is impossible to observe the effects of radiation on normal human subjects, the investigator is forced to work with diseased individuals; hence he will have three factors complicating his results—the disease in question, the effect of treatment on the disease, and, finally, the effect of the rays on the patient's metabolism.

All the patients of this series were in bed, and were maintained on a constant diet. We were not

CHART 2.




Observations on Group 2, Case 1.

able to keep the diet purin-free, as in the experiment of Knudson and Erdos. The urine was collected in 24-hour specimens, which were completely analysed. All cases were examined for at least a week before treatment commenced, in order to fix the normal levels of their urinary constituents. Specimens were analysed so long as the patients remained in hospital. The following observations were made on each specimen: volume, urea, uric acid, ammonia, acidity, total nitrogen, ammonia coefficient, phosphates, chlorides, creatinine, and diastase. As some of the investigations extended over five months it is impossible to publish tables showing all results. Three charts are given (Charts 1, 2, and 3), showing those constituents in which most variation was found, and a general statement based on the tables is also given.

*Results.*

After a careful review of the results it was thought best to classify the observations according to the site of radiation. These fall under four headings: (1) abdominal irradiation; (2) cervical irradiation; (3) thoracic irradiation; and (4) irradiation of any other part of the body.

1. *Results of Abdominal Irradiation.*—In this group five cases were investigated.

CASE 1.—Male, aged 62, admitted suffering from lymphatic leukæmia. He was treated with radium applied to the spleen. The urinary observations were carried on throughout the treatment, a period of four months.

CASE 2.—Male, aged 31, admitted with a carcinoma of the testicle; this was removed, but complete removal of aortic glands was found to be impossible. Intensive X rays were applied to the abdominal gland area.

CASE 3.—Male, aged 41, suffering from spleno-medullary leukæmia. Radium was applied to the spleen and X rays to the long bones.

CASE 4.—Female, aged 46, with carcinoma of the sigmoid colon; the growth was removed after a colostomy had been done; recurrence in and near the colostomy. Intensive X ray treatment was given.

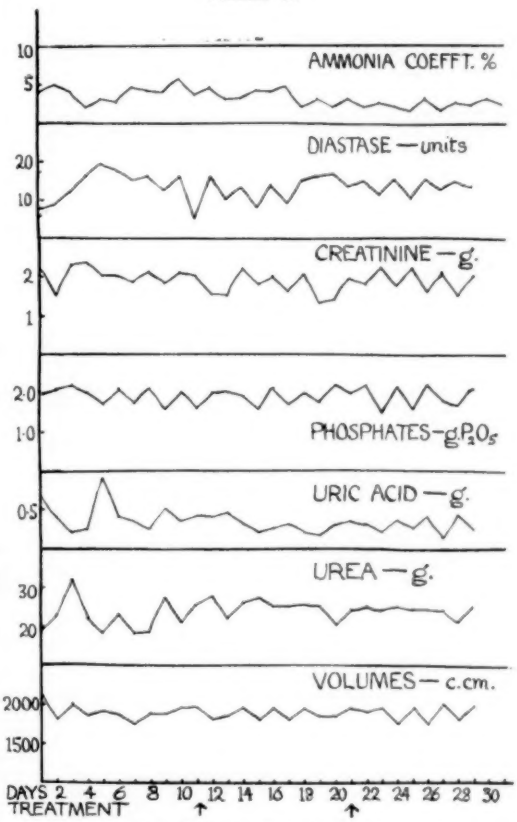
CASE 5.—Male, aged 30, with spleno-medullary leukæmia, treated with radium to the spleen.

In all this series of cases, there was a profound effect on the urine. The results are shown in the following summary.

Volume: Sudden fall to half of normal, recovery in two days.
Urea: Sudden fall to one-eighth of normal, recovery in two days.
Uric acid: Sudden fall to half of normal, rise in three days above normal, recovery in five days.
Ammonia: Sudden fall to 0·7 of normal, recovery in three days.
Acidity: Sudden fall to 0·7 of normal, recovery in three days.
Ammonia coefficient: Rise for three days, fall to normal in six days.
Creatinine: Slight fall.
Phosphates: Slight fall, followed by rise, normal in four days.
Chlorides: Slight rise, normal in six days.
Diastase: Sudden rise, normal in two days.
Total nitrogen: Slight fall, normal in two days.

These results were observed in all the cases investigated. Since it is impossible to reproduce all the

CHART 3.




Observations on Group 4, Case 1.

tables, the chart of Case 1 is published. This shows the variation in volume, ammonia coefficient, uric acid, urea, diastase, and phosphates.

2. *Thyroid or Cervical Irradiation.*—In this group 2 cases were examined, both being cases of exophthalmic goitre.

CASE 1.—Female, aged 45; both sides of neck irradiated (X rays).

CASE 2.—Female, aged 30; both sides of neck irradiated (X rays).

The results of urinary analysis on these cases are quite different from those in Group 1. There was no marked change in any of the urinary constituents

excepting creatinine. This body practically disappears from the urine during the period of irradiation, falling from 1·0 g. to 0·16 g. per 24 hours in Case 1, and from 1·2 g. to 0·09 g. in Case 2. The creatinine did not reach its normal level for four days. The exact explanation of this is very difficult. It has been held that the parathyroids are responsible for some part of creatinine metabolism, probably the conversion of guanidine into creatinine. The above effect could be explained on these lines, assuming that the radiation temporarily paralysed the action of the parathyroid glands.

3. *Thoracic Irradiation.*—Three cases were investigated (including two carcinoma mammæ), but no change was found.

4. *Irradiation of any other Part of the Body.*—A series of cases, with growths of the face and extremities, was investigated, but no change could be found.

### *Investigation of Blood.*

Blood was collected from patients in each case of the above groups before and at varying times after irradiation. The results are shown in Table I. It can be seen that the results are mainly in accordance with the findings on rat's blood—namely, a marked fall in the blood-urea content, with very little change in any of the other constituents.

TABLE I.

| Group. | Case. | Particulars of case. | Non-protein nitrogen. | Urea. | Uric acid. | Amino-acid nitrogen. | Sugar. | Chlorides. | Creatinine. |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | Before treatment. | 35·28 | 42·75 | — | — | 166 | — | — |
| | | 1 day after radium. | 53·20 | 34·00 | — | — | 170 | — | — |
| | 2 | Before. | 42·80 | 22·50 | — | — | — | — | — |
| | | 2 days after Erlangen. | 39·20 | 10·00 | — | — | — | — | — |
| | 3 | Before. | 56·00 | 37·00 | — | — | — | — | — |
| | | 3 days after. | 32·40 | 32·00 | 2·53 | 5·0 | 100 | 478 | 1·25 |
| | | 2 days after 2nd treatment. | 33·00 | 22·80 | 2·07 | 5·2 | 118 | 502 | 1·19 |
| 2 | 1 | 2 days after. | 50·00 | 27·40 | 2·50 | 5·1 | 93 | 540 | 1·20 |
| | | | 48·20 | 26·20 | 2·40 | 5·0 | 100 | 539 | 1·40 |
| 4 | 1 | 24 hrs. after Coolidge. | 31·80 | 26·00 | 3·08 | 4·1 | 119 | 445 | 1·15 |
| | | | 32·50 | 24·00 | 3·12 | 4·6 | 105 | 460 | 1·07 |

### *Investigation of Fæces.*

The fæces were analysed for fat content. The results are given in Table II. There is a rise in fæcal fat content in cases of abdominal irradiation, but no effect could be discovered when other parts of the body were subjected to treatment.

TABLE II.—*Fæces Collected on the Second Day After Irradiation.*

| Group. | Case. | Description of case. | Time of radiation. | Fat % | Free fatty acids % | Neutral fat % |
|---|---|---|---|---|---|---|
| 1 | 1 | Abdominal. | Before. | 28·0 | 8·0 | 3·0 |
| | | | After. | 40·0 | 2·0 | 28·0 |
| | 2 | ,, | Before. | 30·0 | — | — |
| | | | After. | 54·0 | — | — |
| | 3 | ,, | Before. | 21·2 | 11·3 | 2·0 |
| | | | After. | 59·6 | 1·9 | 14·8 |
| 2 | 1 | Cervical. | Before. | 29·2 | — | — |
| | | | After. | 30·6 | — | — |
| 3 | 1 | Thoracic. | Before. | 30·0 | — | — |
| | | | After. | 28·7 | — | — |
| 4 | 1 | Arm. | Before. | 29·3 | 12·0 | 2·0 |
| | | | After. | 30·2 | 10·0 | 2·1 |

### *Conclusions.*

(1) Exactly similar results were found in patients treated with X or with gamma rays.

(2) The changes in metabolism produced in the patients were found to vary with the site radiated. The changes are summarised as follows:—

(*a*) Irradiation of the head, thorax, and limbs produced no change in the metabolism of the cases examined by us.

(*b*) Radiation of the abdomen and spleen produced definite urinary and blood changes—namely, there was a sudden fall in the 24-hourly amounts of the following urinary constituents: urea, uric acid, ammonia, and titratable acidity, creatinine, total nitrogen, and phosphates. The volume of the urine was also greatly decreased. After some three days the excretion of these substances rose to about the normal figure. In the case of uric acid, and of phosphates, the 24-hourly amounts continued to increase after the original level had been reached, but returned to normal again in about five days. The chloride content and diastase showed an immediate increase, returning to normal in about three to six days. The ammonia coefficient showed an increase for about three days, falling to normal in six days. Blood analysis showed a marked decrease in the urea content, with very little change in any other of the blood constituents. These results were obtained in every case of this group investigated. Examination of the fæces showed an immediate increase in the fæcal fat content. This increase is almost solely in the neutral fat fraction.

From these results it would appear that the effects of radiating the abdomen can be explained by a temporary inhibition of the functions of the principal abdominal glands, such as the liver, pancreas, and kidneys. It can be seen that our figures give no support to the acute uræmic theory of Andersen and Kohlmann. We could obtain no evidence of nitrogen retention such as would be expected if uræmia had been induced. These workers based their conclusions on analysis of the mineral content of the blood, a line of work not touched by us, yet most workers will agree that there is always evidence of nitrogen retention in cases of uræmia. The rise in the ammonia coefficient following radiation is in agreement with the acidosis theory of Lange. The increase in the fæcal fat content also supports the work of Whipple and Hall, who showed that radiation of dogs produced marked alimentary symptoms, even verging on to pancreatitis if the dose were large enough. The fall in urea content of the blood is very difficult to explain, but it would appear to us that it might be brought about by a temporary inhibition of the metabolic functions of the liver.

(*c*) Radiation of the cervical region produced no change in the metabolism as evinced by a study of the blood and urine except in one respect. There was an immediate fall in the excretion of urinary creatinine. On the day after exposure this body almost disappeared from the urine, and recovery did not take place until about the fourth day. Practically no alteration in the blood creatinine content was found. This curious effect might be explained by assuming that the parathyroids had been temporarily paralysed, and could not play their normal part in the metabolism of creatinine, which is supposed to be the conversion of guanidine into creatinine.

(3) Three cases of very well marked X ray sickness were examined, but no change in their metabolism following exposure to rays could be detected. The sickness in these cases was apparently psychical.

(4) A considerable number of cases have been treated prophylactically with calcium chloride, &c., before radiation, and a few with sodium bicarbonate; all such cases show less reaction. In the light of the results set forth in this paper, prophylactic measures are being thoroughly investigated.

We have to express appreciation of the interest and kindness of members of the hospital staff, more especially Dr. R. A. Young, Dr. C. E. Lakin, Mr. W. Sampson Handley, and Mr. G. Gordon-Taylor. The amount of work involved in making the analyses detailed in this paper was very great, and we have to thank the members of the staff of the biochemical department who participated therein. This work was made possible through the generosity of Sir William Veno.

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(*Continued at foot of next page.*)

# EXPERIMENTAL AND THERAPEUTIC ALTERATIONS OF HUMAN TISSUE ALKALINITY.*

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THE hydrogen-ion concentration in any tissue depends on the ratio of free carbonic acid to bicarbonate in it. For

$$\overset{+}{H} + H\bar{C}O_3 \rightleftharpoons H_2CO_3 \rightleftharpoons H_2O + CO_2.$$

And since the water concentration varies little, we have approximately

$$[\overset{+}{H}] \times [H\bar{C}O_3] = k[CO_2]$$

$$\therefore cH = [\overset{+}{H}] = \frac{k[CO_2]}{[H\bar{C}O_3]}.$$

The hydrogen-ion concentration of the tissues may be altered by varying the numerator of this fraction, the $CO_2$ pressure. This occurs in respiratory disease, and can be produced experimentally by $CO_2$ inhalation on voluntary overbreathing, but such measures can rarely be employed in therapeutics. It is much easier to alter the bicarbonate concentration. This can be increased by the ingestion either of sodium bicarbonate or the sodium salt of an organic acid, such as acetic or citric, which is rapidly oxidised to bicarbonate. It can be diminished by taking chlorides or certain other salts of ammonium or calcium. Ammonium chloride is absorbed from the gut and converted in the liver and perhaps elsewhere into urea, the hydrochloric acid neutralising bicarbonate.

$$2\,NH_4Cl + 2\,NaHCO_3 = CON_2H_4 + 2\,NaCl + H_2O + 3CO.$$

Calcium chloride reacts in the gut with the alkaline digestive juices, forming calcium carbonate which is excreted per anum, the sodium chloride formed being reabsorbed.

$$CaCl_2 + 2\,NaHCO_3 = CaCO_3 + 2\,NaCl + H_2O + CO_2$$

In each case the final result is the same as if hydrochloric acid had been taken. The urea formed from ammonium chloride is unimportant, but about 10 per cent. of the calcium of calcium chloride is absorbed and causes unpleasant symptoms.

### *Dosage of Inorganic Salts.*

To get a marked effect with inorganic salts, as with alkaloids, we must take an appreciable fraction of the lethal dose. Appropriate doses for adults are 45 g. $NaHCO_3$, 70 g. $NaC_2H_3O_2{\cdot}3H_2O$, 20 g. $NH_4Cl$, 45 g. $CaCl_2{\cdot}6H_2O$. Sodium acetate is much less nauseating and purgative than bicarbonate, and causes no eructation, but it is uncertain how completely large doses are oxidised. Ammonium chloride may cause vomiting in strengths over 2 per cent., whilst calcium chloride produces violent diarrhœa. The results which I am putting forward are mainly those obtained with the above doses of these substances by various colleagues and myself in human experiments at Oxford and Cambridge in the last five years.

Sodium bicarbonate is very rapidly excreted, but it is possible to increase the bicarbonate or "alkali reserve" of the blood by 20 per cent. by its ingestion. The alveolar $CO_2$ pressure rises by much the same amount owing to a slowing down of the breathing, so the reaction of the arterial blood is little altered, though the liver doubtless becomes very alkaline. The urine may contain 3 per cent. of sodium bicarbonate and be free from ammonia. Similar effects are obtained with the acetate.

Ammonium chloride may reduce the alkali reserve and alveolar $CO_2$ pressure to less than half the normal values. The acid excretion in the urine may rise to four times, the ammonia excretion to six times the normal value. But except for hyperpnœa, which is only distressing during exercise, no discomfort is felt. Clinically, acidosis is generally associated with acetone body formation or uræmia. When, however, the bicarbonate of the blood is merely replaced by chloride we have an uncomplicated acidosis, which has no serious effects until at least two-thirds of the lethal dose has been taken. After such an acidosis the alkali reserve does not return to normal for four or five days, so the effect of doses is cumulative.

Alkalosis, whether due to overbreathing or alkali ingestion, causes an upset of carbohydrate metabolism like that of diabetes. Aceto-acetic and $\beta$-oxybutyric acids appear in the urine. The respiratory quotient falls, sometimes to 0·70 and lower, showing that no carbohydrate is being oxidised. The fasting blood-sugar rises only slightly, but polarimetric examination by the method of Winter and Smith shows that, as in diabetes, the normal sugar has been replaced by a highly dextro-rotatory substance. My normal glucose tolerance is more than 200 g., but a dose of 100 g. taken five hours after 60 g. of bicarbonate gave a rise of blood-sugar to 0·19 per cent. with a very slow fall, and glycosuria, without abolishing the acetonuria.

### *Limitations of Alkali Treatment.*

Such results emphasise two points. First, acetonuria should not be treated with alkalies unless there is reason to suspect serious acidosis. Secondly, although alkali treatment saves life in diabetic coma, there is no reason for pushing it to the point of re-establishing the normal alkali reserve. Adlersberg has gone further, and deliberately induced acidosis in mild cases of diabetes by doses of 18 g. per day of $H_2NH_4PO_4$, which is less nauseating than $NH_4Cl$, but acts as a purgative. He was able to halve the urinary acetone excretion and in some cases the glucose excretion also. However, he does not report many cases, and his results may be due in part to the increase of phosphates in the blood. But the probability remains that glucose is best oxidised somewhat on the acid side of the normal reaction.

When, however, the acidosis is pressed too far a different type of disturbance of carbohydrate metabolism arises (in me at least). There is no acetonuria and the respiratory quotient is normal or high—i.e. carbohydrates are easily oxidised; moreover, the rotatory power and fasting level of the blood-sugar is normal. But it rises rapidly after meals, and 100 g. of glucose produce a rise to 0·19 per cent. and glycosuria. There is a failure to store glucose, but not to oxidise it, and the condition is therefore not analogous to diabetes, as believed by authors who produced it in animals. This condition, which may be due to liver damage, appears late in the course of the acidosis and outlasts it. In severe diabetes with acidosis it is

* A summary of remarks made at a meeting of the Section of Therapeutics and Pharmacology of the Royal Society of Medicine on Feb. 12th, 1924.

(*Continued from previous page.*)

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presumably superimposed on the failure of pancreatic function, and an improved glucose tolerance as the result of treatment cannot be taken to indicate a better formation of insulin by the pancreas, or an increased power of oxidising glucose.

Ammonium chloride acidosis has a large effect on inorganic metabolism. We have observed the following urinary excretions per day expressed in percentages of the normal values: Na 250 per cent., K 520 per cent., Ca 330 per cent., P 180 per cent. The first three elements serve to neutralise the acid, the latter to "buffer" the urine. The calcium content of the serum rises by about 10 per cent. Calcium chloride may cause a rise of 25 per cent., the effect of calcium absorption being superimposed on that of acidosis. American observers who were unable to raise their serum calcium had contented themselves with one-tenth of the dosage which we employed. Sodium bicarbonate lowers the serum calcium 10–20 per cent. Ammonium and calcium chlorides are very powerful diuretics. After 65 g. of $NH_4Cl$ in three days my weight falls about 7 lb. and the hæmoglobin of the blood rises by 20 per cent., even although I drink freely. This and the salt excretion are probably due to the fact that the colloids of the body, being brought nearer their iso-electric points, retain less water and salts. Blum and his pupils have found calcium chloride a valuable dehydrating agent in certain types of dropsy and œdema, and it seems likely that ammonium chloride might have a similar effect without producing diarrhœa and malaise. It also appears that the therapy of acidosis should include a liberal supply of potassium and phosphates in cases where the kidneys have been in a position to excrete them.

*Therapeutic Use of Ammonium Chloride.*

The only serious therapeutic use of ammonium chloride so far has been in the treatment of tetany, where Freudenberg and György have used it with striking effect. In infantile tetany the symptoms vanish in a few hours and satisfactory results have also been obtained in gastric and post-operative cases. In a series of infants treated with ½ g. per kilo per day of ammonium chloride the serum calcium rose from a mean value of 6·6 mg. per cent. to 8·9, the phosphorus falling from 4·9 to 2·9. In one American case ammonium chloride was given intravenously with success, but in view of its possible convulsant effects rectal administration would appear preferable when it cannot be given by the mouth.

The rationale of this treatment is the fact that tetany is always produced by forced breathing and sometimes by alkali ingestion. And although many cases may be due to guanidine poisoning, it is probable that even so a given amount of guanidine may be less effective when the calcium of the plasma is increased and its alkalinity diminished.

Many other facts of interest have arisen in the course of the investigations here summarised, notably with regard to oxygen consumption and the metabolism of organic phosphorus compounds, but their application to practical medicine is not yet clear. Moreover, a few of the results here given have only been obtained on a single individual, while their causation is often obscure. They seem, however, to point to therapeutic applications in many fields of medicine, and to testify to the value of experiments on men.

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## HYDROPHOBIA IN EGYPT.

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THERE can be few medical schools in the world with such opportunities for the study of this disease as Kasr-el-Ainy in Cairo. Rabies is an endemic disease among the dogs, the jackals, and the desert wolves in Egypt. To this hospital are admitted all cases of animal bites of Egypt by order of the Ministry of the Interior. In all, the police bring some 2000 cases of animal bite a year; while probably just as many escape the police regulations. We have a medical school, a pathological institute, and an anti-rabic institute, modelled on the lines of the Pasteur Institute, all adjacent. Students enjoy the fullest opportunities of seeing the preparation of dried cords, and inoculation experiments in rabbits, as well as the clinical evidences of hydrophobia developing in our wards.

The clinical aspect of this disease is of the greatest value; for we can observe the earliest development of symptoms as well as the fully developed cases that come to the reception room. The number of cases of hydrophobia is about 15 a year; about half of which develop in hospital and the other half are admitted with symptoms fully developed. The anti-vivisectionists, whose excess of sympathy for the animal kingdom prompts them to oppose any scientific investigation based on animal experimentation, deny the existence of this disease either in animals or in human beings. In animals it is said to be one of the manifestations of sunstroke, and in human beings hysteria. Of all sweeping assertions none has less foundation than this. If one observes the children who develop hydrophobia in hospital one will be convinced that there is no question of suggestion with them. Our English sisters, who are the most experienced of us all in the recognition of this disease, fully bear out this opinion. The initial insomnia, the mental state, the rise in temperature, the terror that is so characteristic, and the gradual development through recognised stages to the fatal ending, should be sufficient to convince any sceptic. Again, in Egypt we have to deal with a simple, lowly-organised fellaheen population that is remarkably free from hysteria or functional disease in any of its manifestations.

*Types of Animal Bites.*

The worst animal bite is that of the camel. The lateral grinding movement of its jaw produces a compound fracture of the long bones; fractures even of the femur and tibia can be caused by camel bites alone, but the incidence of rabies in these animals is low. The rutting season in camels is associated with the development of foam around the mouth of the male; but this is essentially different from the dribbling saliva of the paralytic stage of the rabid camel. The next most serious bite is that of the pig. Though not associated with compound fracture, it is yet the most lacerating of all wounds; a pig can tear the hamstring muscles out of the human thigh. But the incidence of rabies also is low in the pig. From the point of view of the development of hydrophobia the bites of desert wolves and jackals (most jackals are incorrectly called wolves in Egypt) are the most dangerous. A jackal bites the throat and face particularly; and, in fact, the bite of this animal, when it cannot be killed and examined, must be looked upon as potentially liable to produce hydrophobia. The tendency for rabid animals to change their habits and character is responsible for

many of the attacks on human beings. A normal jackal does not frequent cultivated land in the day-time, and is usually so shy as never to attack human beings. By day he is in the rocks and holes of the desert hills. The mere fact of a jackal lying up in a sheltered spot in the fields in the day-time or attacking human beings is strongly suggestive of rabies. The first stage of rabies in our dogs is change of character, shown especially by the habit of standing in the hot sun in an aimless way. The second stage is that of violence, the biting of wood or any object, animate or inanimate, without reason. This is also associated with a tendency to hide behind a bush or in a fence. The third stage is the paralytic one, in which the dog is not really dangerous unless petted or caught. The jaw drops, the legs drag behind him, and saliva dribbles from his mouth, owing to the inability to close the jaws. Of all dogs the discarded hareem pet is most liable to infection. He is taken to the house to amuse the children when a puppy, then driven out when fully grown and forced to wander with no fixed duty or inclination at night-time, when he meets the rabid jackal and goes to see why the latter's movements are so peculiar. Sheep-dogs and house-dogs are not so often affected.

The position and character of the bite are of great importance. Deep lacerating wounds from the canine teeth of wolves or jackals are most dangerous, especially on uncovered areas of the body.

Our experience in Egypt differs from that of workers at Kasauli in India, or Buda-Pesth, or at the Pasteur Institute. The incidence of hydrophobia in our people admittedly bitten by rabid dogs is not so high, nor is the latent period of the development of the disease so prolonged. There is a curious belief in Egypt that if symptoms do not develop before the fortieth day after the bite, they will not develop at all. In our experience this is correct; for of all the cases of hydrophobia in Kasr-el-Ainy in the last four years not one developed it after the fortieth day. The average day was the nineteenth, whether the case was treated by injections of emulsion alone, or of emulsion and serum, or untreated in any way. In fact, the majority of the cases developing in hospital do so just before they are about to be discharged after the twenty-first daily injection. Our experience as to the development of hydrophobia is that 50 per cent. of untreated cases of admittedly rabid wolf-bites of the face develop symptoms of the disease; that 10 per cent. of these cases develop symptoms even if treated; but that of bites in general from all sources (and, of course, dog-bites are the most common) less than 1 per cent. develop the disease. The difficulty that confronts the compilation of all statistics of this disease is that of definitely knowing if the biting animal is rabid or not. The latter either escapes entirely or is shot; in the latter case his brain is usually destroyed and so decomposed by the time it reaches the Anti-Rabic Institute that inoculation experiments with rabbits are out of the question.

*Diagnosis.*

The diagnosis of hydrophobia can be made with almost certain accuracy from the clinical symptoms. The only absolute proof, of course, is the inoculation of filtered human saliva into the brain of a rabbit. Even then care has to be taken that a simple infective meningitis is not mistaken for rabies in the rabbit. The disease is a fascinating study. It is surrounded by an atmosphere of fear of infection among students, doctors, and attendants that is not in the least justified. Not one case of hydrophobia has ever developed in Kasr-el-Ainy among the attendants. One case, however, did develop in Egypt during the war, in an English sister who nursed a soldier suffering from what appeared, at first, to be epileptic fits. She died; but another sister who was equally exposed to infection did not develop the disease. Both were treated by emulsion and by serum.

In our hospital cases the first symptom is a rise in temperature and, for that reason, we watch the fever charts of our dog-bite cases very carefully even when the wound is healed. The next symptom, a very regular one, is insomnia; the patient sits up in bed all night and is disturbed mentally. These cases are nearly always diagnosed by the night sisters. Not, as a rule, until three days have elapsed from the development of these premonitory symptoms does the typical and so-called pharyngeal spasm develop. It is not a pharyngeal spasm at all; it is a spasm of the diaphragm. This symptom can be most aptly compared with the long shuddering inspiratory clonic spasm of the diaphragm that takes place when a child is immersed in cold water. All the accessory muscles of respiration in the neck stand out like cords, and the thorax is raised and fixed. But before this spasm, which is taken, quite rightly, as pathognomonic of the disease, develops, there is a curious and characteristic mental state of uniform and unmistakable terror. (Four other diseases in Egypt are also associated with fear; they are cholera, plague, tetanus, and angina pectoris.) A fear of some impending evil is written in the patient's eyes and in the facial expression; there is also an extreme anxiety to please, but at the same time a deterioration in intelligence. The wound begins to be painful, although it may have healed and there is no sign of inflammation. The patient is at first most amenable to suggestion or to any order, but it has to be repeated more than once. He is so ready to oblige that, if told to lie down in bed, he springs into the bed and betrays an excessive desire to be helpful and obedient. The voice is staccato in character, and we attach great importance to this symptom. This preliminary mental state is very characteristic. Later, usually within 24 hours, when the diaphragmatic spasm has developed, the diagnosis is beyond question; but then the violent terminal stage is near and the patient may soon be difficult to control. Before the stage of spasm it is possible to elicit the spasm of facial muscles and an inspiratory spasm by blowing upon the face. This is diagnostic at this stage and, later, also when the true diaphragmatic spasm has developed. It is a much more merciful, less painful and less distressing method of eliciting this symptom than to ask the patient to drink. When spasm has developed the swallowing of semi-solids is sometimes—and often in children—possible when the swallowing of liquid provokes spasm. Again, the sight of water alone provokes spasm; it is sometimes possible for the patient to drink from a rubber tube attached to a feeding cup in which no water is visible. Usually water in an open vessel induces immediate spasm.

In children, however, the symptoms are sometimes not classical, and these little patients may die without developing any spasm at all, and may drink in comfort up to the end. From the development of spasm the disease in adults lasts, as a rule, 48 hours; and death is due to a generalised neuritis and paralysis of the higher centres. But in children the disease may last five to seven days, and death may be sometimes accelerated by fluid starvation. Such is the disinclination, owing to the fear of infection on the part of some attendants, to apply the ordinary rules of nursing that one feels the want of fluid is partly responsible. In some of our cases, however, the patients have been given saline and nutrient enemata by the sisters to the end. Stomach-tube treatment is only possible under an anæsthetic, and is possibly quite ineffectual, inasmuch as the food appears to pass entirely indigested. The eyes become early inflamed, and muco-pus gathers in the internal canthus. Around the edges of the mouth dried mucus collects. The patient spits all over the floor.

The terminal violent stage is characteristic. The terror is most pronounced and suspicion is most marked. Often if one approaches alone it is possible to give a hypodermic injection; but if a crowd of attendants are present their fear and alarm is so easily conveyed to the patient that no efforts are of any avail. Until the final eight hours, when, as a rule, paralysis of the lower limbs develop and the patient drags himself about the floor, the violence is chiefly directed to climbing the walls of the strong room or

attempting to reach the embrasure of the window. All clothing is torn off, and the patients always die naked unless treated with hyoscine. The spectacle is a pitiable one. These patients, though inclined to crouch in a corner, are yet afraid of darkness. In their delirium they recapitulate the incidents of the dog or wolf attack, and they have delusions of vision and of hearing. They are always quieter in the light, either daylight or artificial. Children retain the remembrance of friendly faces almost until the end, and can be nursed and comforted by their accustomed nurses or sisters when the sight of a doctor rouses immediate terror. Usually, when the spasm has developed, symptoms of neuritis of the legs develop also, and knee-jerks and ankle-jerks and plantar reflexes are lost; in some cases the latter are exaggerated until the end. There is no change in the pupil reflex. The noises which are so often referred to as "dog-barking" or "wolf howls" have no foundation in fact whatsoever. They exist only in the imagination of observers. There is inspiratory phonation during spasm, and constant chattering during the violent stage. Later on, phonation is discordant and articulation is lost; but never can one observe any semblance to the howl of a wolf. Nor do patients ever attack or try to bite attendants; they only resist treatment. This disease, however, is clothed with so much exaggeration and fear of infection that any story is possible to a lively imagination.

*Treatment.*

Our treatment of the bite is by the cautery or excision or by caustics. Then, until the animal is definitely proved to be non-rabid, by emulsions of dried cords of rabbits daily for 21 injections. If the bite is a severely lacerated one or a definite wolf-bite, or situated upon the face, the treatment given is by serum as well as by glycerine emulsion.

Our treatment of the symptoms is by hyoscine and morphia; then, when violence is controlled, the treatment that we adopt for the disease itself is the intravenous injection of novarsenobenzol or tartar emetic. This is largely empirical, on the presumption that we may have to deal with a filter-passing virus of the nature of that causing horse-sickness. But we have had no successful results to publish—unless it be one doubtful case that recovered, in whom the disease may have been aborted by an injection of 606. He exhibited the characteristic mental state, and spasm of the facial muscles could be elicited by blowing upon the face, but he had not developed the true diaphragmatic spasm. Steps are being taken to undertake inoculation experiments in rabbits with filtered saliva in all our doubtful cases.

The treatment of the disease, however, must be commenced at once. As swallowing is usually impossible and rectal treatment is not tolerated, recourse must be had to hypodermic injection. In some cases of children, without spasm, sulphonal in 3 gr. doses is effectual in controlling violence, but in adults hyoscine is the drug and the only drug. Morphia alone is useless; but when combined with hyoscine in doses of 1/50 gr. the violence is controlled and the patient can be nursed in a bed.

We have had no cases among Egyptians of hysteria simulating this disease or of the mimicry of symptoms in order to obtain sympathy or to base a claim for compensation; but we hear of one European who developed hysterical spasm of the pharyngeal muscles on his way down from Khartoum to Cairo for treatment. Rabies, by the way, is very rare indeed among the dogs or jackals in the Soudan.

Our pathological investigations into this disease are disappointing. Even in undoubted and fatal clinical cases of hydrophobia we only find Negri bodies in 20 per cent., either in the blood or in the region of the hippocampus major of the brain. The mortality is 100 per cent. as far as we know. But until we begin to inoculate rabbits as a routine method with filtered saliva we shall never be sure that some of our recovered cases with mental symptoms and signs of a peripheral neuritis are not, in fact, cases of cure or cases of hydrophobia modified by treatment.

We are indebted to Mr. A. E. Branch, Director-General of the Veterinary Service, for the following statement and figures of rabies prevention in Egypt:—

Eighty-one cases of rabies were reported during the year 1922, against 120 cases in the previous year.

The total number of dogs and cats destroyed during the year was 103,000—distributed as follows: Provinces, 74,416; Cairo, 13,543; Alexandria, 5966; Dogs' Home, Boulac, 9075. The Cairo police seized and sent to the Dogs' Home, Boulac, 10,988 dogs, of which number 9075 were destroyed.

The total number of animals placed under observation was 455, classified as follows: Dogs 400, cats 27, monkeys 20, horses 2, camels 1, donkeys 3, foxes 1, weasels 1.

## MALARIA THERAPY IN GENERAL PARALYSIS OF THE INSANE.

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DURING the past few months several articles on the treatment of general paralysis of the insane by inoculation with malaria have appeared in the medical press of this country, but, so far as we have seen, no detailed report on the reactions of the blood and cerebro-spinal fluid after treatment has been published. In this preliminary report we propose to deal with our observations on the blood and cerebro-spinal fluids (C.-S.F.) of 40 cases treated at the County of Lancaster Mental Hospital, Whittingham. For one reason or another it was not possible to apply all the tests in some of the cases, but comparisons have been drawn wherever possible.

Of the 40 cases reported on, 16 had a course of preparations of salvarsan after the malaria had been arrested by the administration of quinine. In these cases the blood and C.-S.F. were not examined until at least one month after the administration of the last dose of salvarsan. In some cases several examinations of the blood and fluid were made to investigate the possibility of progressive changes in the findings. In all, 49 C.-S.F. examinations and 46 blood examinations were made after treatment. Of the 40 cases we review, in 40 per cent. the fluid was examined during the first month after treatment had been stopped, in 10 per cent. during the second month, in 30 per cent. between the third and sixth month, and, finally, in 20 per cent. between the sixth and thirteenth month. The accompanying table contains a synopsis of the readings of the C.-S.F. and blood reactions both before and after treatment.

1. *Colour.*

Xanthochromia occurred in one of our series (Case 33). Lumbar puncture two days following the disappearance of the *Plasmodium vivax* from the circulating blood revealed a yellow fluid, intensely stained, even following prolonged centrifugalisation at a high velocity. Spontaneous coagulation or a marked increase in protein was absent, whilst the chemical tests for bile gave consistently negative results. A microscopic examination of the centrifuged deposit revealed broken-down and effete red cells and granular debris. The colour persisted for a short time only, as a series of punctures at intervals of a few days manifested a gradual diminution in its intensity with final disappearance of all colouring matter at the end of 14 days.

2. *Cytology.*

A decrease in cells was an early change noted in 91·5 per cent. of 37 fluids examined. In this series they varied in number from 1·6 to 61 cells per c.mm. and were uniformly made up of small and large

lymphocytes, the large cell predominating. The decrease in the number of cells per c.mm. worked out as follows: between 0 and 5 cells per c.mm., 24·3 per cent.; between 5 and 10, 32·4 per cent.; 10 and over, 35·1 per cent. An actual increase took place in 8·2 per cent.

### 3. *Protein.*

A lowered protein content, as estimated by the ring test of Ross-Jones and the reaction of Pandy, was another early feature in the 49 per cent. of cases in which this phenomenon occurred. No change was observed in a little less than 45 per cent. of the series.

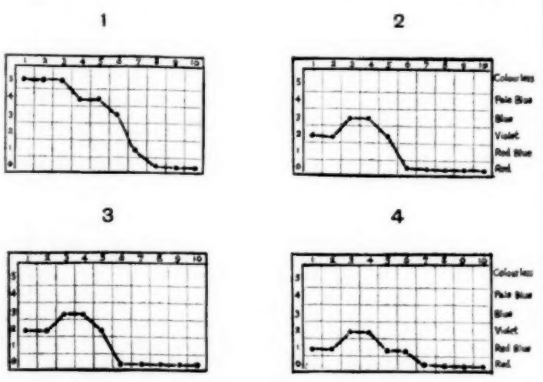
### 4. *Cellular Decrease with Lowered Protein Content.*

This combined change was seen in 64·8 per cent. of all treated cases. Comparisons were not made in those instances where red blood corpuscles were demonstrated by the microscope.

### 5. *The Colloidal Gold Reaction of Lange.*

The gold solution was prepared according to the method of Miller, Brush, Hammers, and Felton.[1] Each fresh supply of the reagent was tested before use with known normal and known general paralytic fluids, and the tests were carried out in the usual manner. In all cases the lumbar fluids were examined within an hour of their withdrawal. The readings were made in daylight and charted after the tubes had been allowed to stand at room temperature for 12 hours.

In expressing the results, the numeral 5 is used to indicate complete decolorisation due to complete




Case 21.—1. Curve before treatment, Nov. 2nd, 1922. The parasites disappeared May 2nd, 1923. 2. Curve on Sept. 7th. 3. Curve on Oct. 15th. 4. Curve on Dec. 14th.

precipitation of the colloidal gold, whereas the numbers 4, 3, 2, and 1 indicate the colours of pale blue, blue, violet, and red-blue respectively. No change in colour is represented by 0. The "paretic" curve shows complete decolorisation in the first few tubes (three or more), with lesser colour changes in the remainder, giving a reading such as 5555543210. Incomplete precipitation, but with general conformation of the curve, represented by a reading as 4444321000, would still be regarded as fairly typical. The "mid-zone" or "luetic" curve shows no change in the first one or two tubes, with the maximum colour reaction in the fourth or fifth tubes giving a reading as 0012211000.

The test was performed in the whole series of our cases and repeated at varying intervals in a few instances where a marked change in the reading first appeared. In this way we were able to observe and to follow the conversion of a typical "paretic" to a "luetic" curve. In none of our cases can we say that an absolute negative gold solution resulted from the malarial treatment. In 28 fluids, or 70 per cent. of the cases, the "paretic" curve remained unchanged, whilst in nine fluids, or 22·5 per cent., the "paretic" curve persisted, clouded, however, by a slight colour change. The first three or four tubes in these cases appeared as though the gold solution had been completely precipitated, except for a faint bright-pink coloration which we have expressed in the table as { 5555 / 4444432000.

"Luetic" curves were demonstrated in three fluids (Case Nos. 4, 21, and 39), or 7·5 per cent. of the series. Case 21 is very helpful in observing the changes through which the colours pass in the conversion of a "paretic" to a "luetic" curve. (See charts.)

### 6. *The Colloidal Gamboge Reaction.*[2]

The colloidal gamboge reaction was introduced as one of the routine tests of the C.-S.F. in our laboratory in the early months of 1922, when Riddel and Stewart found that by using a colloidal suspension of gamboge they were able to obtain "paretic" curves in 100 per cent. of the cases of general paralysis. Briefly the test is interpreted as follows: A negative reaction is shown by a total absence of precipitation in all six tubes and would be indicated in numerals with the reading 000000. Complete precipitation of the gamboge (indicated by the numeral 2) in the first three or more tubes is known as the "paretic" curve. This curve, seen in all our untreated cases of general paralysis, is represented by the reading 222220. Partial precipitation (indicated by the numeral 1) in the first three tubes, the "luetic" curve, is a fairly constant reading in cases of meningo-vascular syphilis. It reads 111000. In meningitis, complete precipitation occurs in the higher dilutions (tubes 4 and 5), tubes 1 and 2 usually remaining negative. The colloidal gamboge reaction in a recent case of pneumococcal meningitis (confirmed by autopsy) gave the reading 112220. The test was carried out with all the fluids of the series and the following observations were made. The "paretic" curve remained unchanged in 32 cases, or 80 per cent.; showed a slight change in seven cases, or 17·5 per cent.; whilst a "luetic" curve resulted in one case, or 2·5 per cent. of the series. A negative reaction was not obtained. In comparing the values of the two colloidal tests as an indication of changes in the C.-S.F. following the malaria treatment, it will be seen from these results that the percentage change in the gold solution (30 per cent.) was higher than the corresponding change (20 per cent.) in the gamboge reaction.

### 7. *The Wassermann Reaction of the Cerebro-spinal Fluid.*

Comparisons were possible in 29 fluids, as in this number of cases had records been kept both before and after treatment. In this series three became negative, six weakly positive or doubtful, whilst 20 remained unchanged. In the 11 cases where the W.R. was not obtained before treatment three negative findings occurred, making a sum total of six, or 15 per cent., negative serum reactions of the whole series.

### 8. *Wassermann Reaction of the Blood.*

The same difficulties as with the C.-S.F. allowed us to make comparisons in the readings of only 24 sera. A reduction in the intensity of the reaction was an early feature of the treated cases, and accounted for 17 of the 24 sera examined. Five remained unchanged, whilst two became negative. In all 40 cases, 23, or 57·5 per cent., were weakly positive or doubtful, and three, or 7·5 per cent., were negative. The W.R.'s of the C.-S.F. and blood were concurrently negative in two cases; three of the six negative W.R.'s of the C.-S.F., and all three of the negative blood W.R.'s, occurred in cases treated by salvarsan. Likewise to the two cases where the blood and C.-S.F. W.R.'s were concurrently negative salvarsan had been given.

Early changes observed were diminished protein content and a decrease in lymphocytosis of the fluid, and a reduction of the W.R. of the blood. A combina-

[1] Miller, Brush, Hammers, and Felton: Bull., Johns Hopkins Hosp., 1915, xxvi., 391.

[2] Riddel and Stewart: Journal of Mental Science, October, 1922.

| Case No. and Sex. | Stage of disease. | Age. | Date of disappearance of parasites. | Dates of taking specimens. | Ross-Jones' R. | Pandy R. | No. of cells per c.mm. | Lange colloidal gold test. | Colloidal gamboge test. | Wass. R. C.-S.F. | Wassermann R. Blood. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. M | L | 42 | — | 20/7/22 | + + | | 47 | 5555555443 | 222210 | + + | + | |
| | | | 11/9/22 | 22/10/23 | f. + | f. + | 18·3 | 5555422000 | 222210 | + | + | |
| 2. M | L | 36 | — | 20/7/22 | + + | | 69 | 5555554421 | 222110 | + + | + | |
| | | | 11/9/22 | 22/10/23 | + | f. + | 119 | 554 | 221000 | + | Weakly +1 in 5 | |
| | | | | | | | | 44332200000 | | | | |
| 3. M | L | 42 | — | 10/8/22 | + + + | | 44 | 5555555420 | 222210 | + + | + 1 in 40 | |
| | | | 6/9/22 | 22/10/23 | f. + | f. + | 2·3 | 5554320000 | 221000 | + | Weakly +1 in 4 | |
| 4. M | E | 38 | — | 7/8/22 | + + | | 196 | 5555554100 | 222110 | + | +1 in 5 | |
| | | | 6/10/22 | 24/7/23 | f. + | f. + | 61 | 0013300000 | 221000 | + | +1 in 5 | S. |
| 5. M | L | 58 | — | 4/11/22 | + + | | 64 | 5555543310 | 222110 | + | + | |
| | | | 23/1/23 | 22/10/23 | + | f. + | 13 | 5555432000 | 222210 | + | Weakly +1 in 4 | S. |
| 6. M | E | 34 | — | 1/2/23 | + | + | 62 | 5555532200 | 122220 | + | N.D. | |
| | | | 19/4/23 | 22/10/23 | f. + | f. + | 4·6 | 554 | 221000 | Doubtful | +1 in 15 | |
| | | | | | | | | 44333200000 | | | | |
| 7. M | L | 41 | — | 29/3/23 | + | + | 53 | 5555543200 | 222210 | + | N.D. | |
| | | | 30/5/23 | 23/10/23 | + | + | 6·3 | 555 | 222100 | + | +1 in 10 | |
| | | | | | | | | 44443200000 | | | | |
| 8 M | L | 43 | — | 9/1/23 | + + | + + | 11 | 5555543300 | 222210 | + | N.D. | |
| | | | 17/7/23 | 23/10/23 | + | + | 3 | 5555422000 | 222110 | Neg. | Doubtful 1 in 2 | S. |
| 9. M | E | 41 | — | 8/6/23 | + | + | 169 | 5555554320 | 222220 | + | +1 in 40 | |
| | | | 11/8/23 | 23/10/23 | + | + | 15 | 5555 | 222210 | + | Doubtful 1 in 2 | S. |
| | | | | | | | | 44444320000 | | | | |
| 10. M | E | 30 | — | 26/4/23 | + | + | ·18 | 5555554320 | 222220 | + | +1 in 40 | |
| | | | 11/8/23 | 23/10/23 | + | + | 11·3 | 5555422000 | 222220 | + | Weakly +1 in 5 | S. |
| 11. M | L | 38 | — | 24/1/23 | + + | + + | 26·3 | 5555554320 | 222220 | + | + | |
| | | | 23/8/23 | 23/10/23 | + | + | 6·6 | 5555432000 | 222210 | + | Doubtful | |
| | | | | 13/9/23 | | | | | | | +1 in 15 | S. |
| 12. M | E | 41 | — | 28/5/23 | + | + | 20·3 | 5555543200 | 222220 | + | + | |
| | | | 16/9/23 | 23/10/23 | + | + | 9 | 555 | 222210 | Neg. | Neg. | |
| | | | | 13/9/23 | | | | 44443200000 | | | Doubtful 1 in 2 | S. |
| 13. M | L | 38 | — | 14/8/23 | + | + | 56·3 | 5555432000 | 222100 | + | N.D. | |
| | | | 16/9/23 | 25/10/23 | + | f. + | 4 | 555 | 221000 | Neg. | Neg. | |
| | | | | 13/9/23 | | | | 44443200000 | | | Neg. | S. |
| 14. M | L | 44 | — | 16/2/23 | + + | + + | 178·6 | 5555554320 | 222220 | + | +1 in 45 | |
| | | | 16/9/23 | 25/10/23 | + + | + + | 18·3 | 5555554320 | 222220 | + | +1 in 45 | S. |
| 15. M | E | 54 | — | 31/5/23 | + | + | 15 | 5555432000 | 222220 | + | N.D. | |
| | | | 29/9/23 | 23/10/23 | + | + | 24 | 5555432000 | 222220 | + | Doubtful | |
| 16. M | E | 57 | — | 7/6/23 | + | + | 35·6 | 5555432000 | 222210 | + | N.D. | |
| | | | 14/10/23 | 26/10/23 | + | + | 16 | 5555543200 | 222220 | + | +1 in 10 | |
| 17. M | L | 45 | — | 15/6/23 | + | + | 37 | 5555555430 | 222220 | + | N.D. | |
| | | | 23/10/23 | 26/10/23 | + + | + + | 18·6 | 5555543200 | 222220 | Doubtful | Doubtful | |
| 18. M | E | 39 | — | 23/4/23 | + | + | 68 | 5555543200 | 222220 | + | N.D. | |
| | | | 30/10/23 | 1/11/23 | + | + | 27 | 5555554320 | 222220 | + | Weakly +1 in 8 | |
| 19. F | L | 46 | — | 5/6/23 | + | + | 33·6 | 5555543000 | 222210 | + | N.D. | |
| | | | 20/7/23 | 8/1/24 | + | + + | 5·3 | 5543210000 | 222220 | + | Strongly +1 in 25 | |
| 20. F | Juv. G.P.I. | 20 | — | 22/7/22 | + + + | | 279 | 5555555543 | 222220 | + | +1 in 40 | |
| | | | 28/1/23 | 8/11/23 | f. + | f. + | 9 | 5555420000 | 222100 | + | Weakly +1 in 8 | |
| 21. M | L | 38 | 2/5/23 | 2/11/22 | + | | 166 | 5554431000 | 222110 | N.D. | N.D. | |
| | | | | 7/9/23 | f. + | + | 1·6 | 2233200000 | 211000 | Doubtful | N.D. | |
| | | | | 15/10/23 | f. + | + | 4 | 2233200000 | 210000 | Neg. | N.D. | |
| | | | | 14/12/23 | − | + | 0·6 | 1122110000 | 100000 | Neg. | Weakly +1 in 5 | |
| 22. M | L | 53 | 14/6/23 | 6/6/22 | + + | + | 39 | 5555544320 | 222210 | N.D. | +1 in 15 | |
| | | | | 17/9/23 | f. + | + | 8·3 | 5555432000 | 222210 | + | +1 in 10 | |
| | | | | 25/10/23 | + | f. + | 4 | 5555432000 | 222210 | + | +1 in 10 | |
| 23. M | L | 52 | 17/8/23 | 7/9/22 | + + | + | 71 | 5555555432 | 222220 | N.D. | N.D. | |
| | | | | 26/10/23 | + + | + + | 14·6 | 5555543200 | 222220 | + | +1 in 15 | S. |
| 24. M | L | 51 | 26/11/23 | 26/10/23 | + + | | 43 | 5555543000 | 222220 | + | +1 in 25 | |
| | | | | 20/12/23 | + | + | 7·3 | 5554321000 | 222210 | Doubtful | Weakly +1 in 5 | |
| | | | | 8/1/24 | + | + + | 9 | 5555321000 | 222220 | ,, | N.D. | |
| 25. M | L | 35 | 6/3/23 | 1/11/22 | + | | 24 | 5555543100 | 222110 | N.D. | N.D. | |
| | | | | 1/11/23 | f. + | + | 40 | 5555543200 | 222210 | + | +1 in 15 | |
| 26. M | L | 44 | 11/7/23 | 6/2/23 | + + | + + | 43·6 | 5555543320 | 222220 | N.D. | + | |
| | | | | 1/11/23 | ± | + | 20 | 5555432000 | 222100 | Doubtful | +1 in 5 | S. |
| | | | | 18/9/23 | | | | | | Neg. | | |
| 27. M | L | 44 | 3/7/23 | 2/11/22 | + + | | r.b.c. | 5555433100 | 222220 | + | + | |
| | | | | 1/11/23 | f. + | + | 3 | 5555543200 | 222100 | + | Neg. | S. |
| 28. M | L | 52 | 1/7/23 | 20/12/21 | + + + + | + + | 61 | 5555555530 | 222200 | N.D. | + | |
| | | | | 1/11/23 | + | + | 3 | 5555554320 | 222220 | + | Weakly +1 in 5 | |
| 29. M | L | 54 | 1/7/23 | 1/11/22 | + | + | 36 | 5555543100 | 222110 | N.D. | + | |
| | | | | 1/11/23 | f. + | + | 5·3 | 5543220000 | 222000 | + | Weakly +1 in 3 | S. |
| 30. M | L | 37 | 25/7/23 | 13/2/22 | + + | + | 44 | 5555321000 | 222110 | N.D. | N.D. | |
| | | | | 1/11/23 | ± | f. + | 5·3 | 5555432000 | 221000 | + | +1 in 5 | S. |
| 31. M | L | 44 | 12/5/23 | 27/6/22 | + + | | 34 | 5555555553 | 222220 | N.D. | N.D. | |
| | | | | 5/11/23 | f. + | + | 11 | 555543200 | 222110 | + | +1 in 45 | |
| 32. M | L | 56 | 28/10/23 | 4/9/23 | + + | + + | 80·6 | 5555542000 | 222220 | + | + | |
| | | | | 5/11/23 | + | + | 33·6 | 5555554320 | 222210 | + | Weakly +1 in 5 | |
| 33. M | E | 35 | 6/11/23 | 7/9/23 | + + | + + | 36 | 5555543200 | 222220 | + | N.D. | |
| | | | | 8/11/23 | + + | + + | r.b.c. | 5555553200 | 222220 | + | Weakly +1 in 4 | S.* |
| | | | | 15/11/23 | + | + | 9 | 5555554200 | 222220 | + | ,, | S.* |
| | | | | 22/12/23 | + | + | 4 | 5554321000 | 222210 | + | ,, | S.† |
| 34. M | E | 51 | 3/12/23 | 26/9/23 | + + | + + | 26 | 5555432000 | 222220 | + | +1 in 20 | |
| | | | | 20/12/23 | + | + | 4·6 | 5555432100 | 222220 | N.D. | +1 in 15 | |
| | | | | 8/1/24 | + + | + + | 13·3 | 5554431000 | 222220 | + | +1 in 15 | |
| 35. M | L | 43 | 8/12/23 | 12/11/23 | + | + | 147·3 | 5555421000 | 222110 | + | +1 in 15 | |
| | | | | 20/12/23 | + | + | 8·3 | 53 | | | | |
| | | | | | | | | 5423211000 | 221000 | + | +1 in 15 | |
| 36. M | L | 47 | 20/12/23 | 12/11/23 | + + | + + | 48·6 | 5555542100 | 222220 | + | +1 in 45 | |
| | | | | 20/12/23 | f. + | + | 4·3 | 5555432100 | 222220 | + | +1 in 45 | |
| 37. M | L | 44 | 29/12/23 | 7/9/23 | + + | + + | 23 | 5555432000 | 222210 | + | +1 in 15 | |
| | | | | 30/12/23 | + | + | r.b.c. | 5555542100 | 222220 | N.D. | N.D. | |
| 38. M | E | 44 | — | 15/10/23 | + | + + | 103·6 | 5555433000 | 222220 | + | +1 in 15 | |
| | | | 10/1/24 | 11/1/24 | + | + + | 26 | 5555543100 | 222210 | + | Weakly +1 in 5 | |
| 39. M | L | 42 | — | 7/9/23 | + | + | 32 | 5555432000 | 222210 | + | +1 in 15 | |
| | | | 30/11/23 | 20/12/23 | f. + | + | 6 | 5443211000 | 222100 | + | +1 in 5 | |
| | | | | 8/1/24 | + + | + | 7 | 1112100000 | 222100 | + | N.D. | |
| 40. F | L | 35 | — | 1/9/21 | + + | + + | 14 | 5555544200 | 222210 | N.D. | + + | |
| | | | 30/8/23 | 10/9/23 | + + | + + | r.b.c. | 5555543200 | 222220 | Neg. | Weakly +1 in 3 | |

First line in each case represents the readings in the fluid and blood before treatment.
S = Case treated by malaria inoculation and salvarsan. S* = Xanthochromia. S† = Clear and colourless. E = Early case.
L = Case in late stages. f. + = faintly positive. N.D. = Not done. M = Male. F = Female.

tion of all three changes occurred in 16, or 40 per cent., of the whole series of cases. Of the 16 cases treated with salvarsan seven, or 43·7 per cent., of this series provided the same combination of changes. We were able to make further observations on the changes in the C.-S.F. in a series of 29 fluids where all the reactions had been carried out both before and after treatment:

(*a*) In six cases (vide cases Nos. 1, 3, 6, 8, 13, and 24), or 20·3 per cent., there were present in the fluid a lowered protein content, a cellular decrease, and a reduction in the fluid W.R.

(*b*) In two cases (vide cases Nos. 6, 13), or 6·7 per cent., there were seen in the fluid a lowered protein content, a cellular decrease, a reduction in the fluid W.R., and slight to marked changes in the gold-sol test. The gold-sol test was the last of the fluid reactions to show any change.

Salvarsan had been given in three of the six cases discussed in the subchapter (*a*) and to one of the cases mentioned in subchapter (*b*).

*Summary.*

In a series of 40 cases of general paralysis treated by inoculation with malaria, 16 of which received in addition a course of salvarsan, observations were made on the findings in the C.-S.F. and blood, and comparisons made where possible. As the times of the withdrawal of fluids following the fever treatment varied from one day to 13 months, we were able to observe whether immediate changes, if any, progressed or remained stationary.

No improvement in any of the cerebro-spinal fluid reactions occurred in one case—No. 15. It will be seen, however, that the W.R. of the blood was returned as doubtful, so that in reviewing the changes of the whole series of the liquor and serum reactions we obtained in *every* case some alteration either in the fluid or serum or in both following treatment.

The earliest signs of improvement were manifested by a diminished lymphocytosis and lowered globulin content of the C.-S.F. and by a reduction in the intensity of the blood W.R. First, the lymphocytes in the fluid decreased (91·9 per cent.); secondly, the blood W.R. diminished in intensity (65 per cent.); and then the protein content of the liquor became less positive (49 per cent.). A combination of all three changes occurred in 40 per cent. of the series.

The W.R. of the C.-S.F., the colloidal gamboge reaction, and the colloidal gold test were favourably influenced at a somewhat later period. The changes in order of frequency were W.R. of C.-S.F. 30 per cent., colloidal gold 30 per cent., and colloidal gamboge 20 per cent. A combined improvement in the globulin and cellular content and W.R. of the fluid occurred in 20·3 per cent. of all cases. Including the gold-sol test there was a combined improvement in 6·7 per cent. Negative W.R.'s were obtained in the C.-S.F. and the blood in 15 per cent. and 7·5 per cent. of the respective series. In two cases, or 5 per cent., were the liquor and serum W.R.'s concurrently negative.

Taking the 16 salvarsan cases as a separate series, the following percentages of readings of improvement in both fluid and serum were estimated: (1) diminished pleocytosis, 100 per cent.; (2) serum W.R. reduction, 68·7 per cent.; (3) lowered protein content 46 per cent. Combined changes (1, 2, and 3) occurred in 43·7 per cent.

Combined improvement in the cell count, protein content, and W.R. of C.-S.F. took place in 18·7 per cent., and with the gold-sol test in 6·2 per cent. of the whole series. The W.R.'s of the C.-S.F. and the blood serum were negative in 25 and 18·7 per cent. respectively—concurrently in both in 5 per cent.

We beg to acknowledge our indebtedness to Dr. R. M. Clark, medical superintendent of the hospital, for permission to place on record the results of these investigations. The Wassermann reactions of cerebro-spinal fluid and blood were kindly carried out for us at the Public Health Laboratory, Manchester, under the direction of Prof. W. W. C. Topley.

# Medical Societies.

## ROYAL SOCIETY OF MEDICINE.

### JOINT MEETING OF THE SECTIONS OF MEDICINE, SURGERY, AND THERAPEUTICS AND PHARMACOLOGY.

AT a joint meeting on March 5th, Mr. CYRIL A. R. NITCH (President of the Section of Surgery) in the chair, a discussion was held on the

#### TREATMENT OF GASTRIC AND DUODENAL HÆMORRHAGE.

Mr. HERBERT J. PATERSON, opening the discussion, said that the surgical treatment of hæmorrhage from gastric and duodenal ulcers might be discussed in reference to two distinct groups of cases, the sudden acute hæmorrhages, threatening life itself, and chronic or recurrent hæmorrhages, less alarming in extent, but tending to produce a profound anæmia, which, if unchecked, might ultimately prove fatal. From a surgical point of view this classification seemed preferable to that in which a distinction was drawn between hæmorrhage from a so-called acute ulcer and hæmorrhage from a chronic ulcer, because it was not known that there was such a pathological distinction, and, if there were, it could not be recognised clinically. The duration of symptoms had no relation to the chronicity of an ulcer as seen in the operation theatre.

*Acute Hæmatemesis.*

Although aware of the danger of laying down hard-and-fast rules, he believed there should be no such thing as surgical intervention in cases of acute hæmatemesis—that operation during the progress of gastric or duodenal hæmorrhage should never be attempted. The collapse induced by loss of blood was favourable for arrest of hæmorrhage, but unfavourable for surgical intervention. It could usually be arrested by medical treatment; such patients, if subjected to operation, were exposed to added dangers, whereas without operation the probability was that they would recover. Two questions arose in this connexion: (1) the mortality-rate from hæmorrhage in cases treated medically, and (2) the mortality-rate in cases treated by immediate operation. Most clinicians were agreed that the mortality-rate from hæmorrhage in cases of gastric and duodenal ulcer treated medically was under 5 per cent. In the four series of cases collected by Lenhartz, Ewald, Wirsberg, and H. P. Hawkins the average mortality-rate was 3·8 per cent. With regard to the mortality-rate of the cases treated by immediate operation, Lindberg, in 1914, tabulated 83 cases with 30 deaths, a mortality-rate of 36 per cent. Those statistics might be called out of date, and more modern technique, especially with blood transfusion, might be claimed to secure better results at present, but he was not clear that there was ground for this optimism; at any rate, the results of surgical treatment were still indubitably inferior to the results of medical treatment. Through the courtesy of the surgical registrars of some of the London hospitals he had obtained some statistics as to immediate operation for acute hæmatemesis in recent years. In 19 cases there were 7 deaths (mortality-rate 36·8 per cent.). Obviously it was unfair to compare these figures with the mortality-rate in all cases of ulcer, whether they bled or not; they must be compared with the mortality-rate in severe cases of hæmatemesis. Hæmorrhage occurred in at least two-thirds of all cases of gastric ulcer, and was severe or recurrent in about 30 per cent. Calculated on this basis the mortality-rate of cases with severe or recurring hæmorrhage treated medically would be about 11 per cent. He thought this was probably an exaggeration, but it would be well within the mark to state that of the patients who bleed severely or repeatedly and are treated medically not more than 1 in 9 would die, while of those treated by immediate operation 1 out of 3 would probably die. No doubt

some surgeons by superior skill, aided by a considerable share of luck, might be able to show much better individual results than these. He said "aided by luck," for in a given case it was impossible to predict whether one could find, let alone deal with, the source of the bleeding.

*A Series of Cases Personally Treated.*

Apart altogether from statistics, he was convinced that the treatment of acute hæmatemesis by medical means was the wiser and safer course. It could not be emphasised too strongly that patients rarely died of a first hæmorrhage; repetition was the important thing. As for the argument: "This patient is bleeding; he will probably die; something must be done"—even were the premises true, he saw no reason for doing something which would probably make the patient's life shorter still. The case was quite different in acute intestinal obstruction, where without surgical intervention death was inevitable, so that operation was justifiable even in desperate cases. In hæmatemesis, on the other hand, operation might be the last straw for a patient who otherwise might recover. Up to the end of 1921 he had had under his care, or jointly with Dr. Soltau Fenwick, 40 cases where hæmatemesis was so severe that the patients were on the point of death, but all of them recovered with medical treatment; indeed, he had yet to see a death from hæmatemesis from a gastric or duodenal ulcer. All these patients were first treated medically, and in all but two gastro-jejunostomy was performed two or three months later. In four cases he could find no ulcer; the hæmorrhage was probably secondary to a diseased appendix; these were among his very early cases, and he now admitted that the gastro-jejunostomy was a totally unnecessary complication of appendicectomy. One patient had a slight hæmatemesis two months after operation, and no subsequent recurrence up to the time of death three years later from causes unconnected with the gastric condition. Another patient was readmitted into hospital a year after discharge in a moribund condition from a perforated jejunal ulcer. Thus the immediate operative mortality in this series was nil, and all but two of the patients were apparently cured.

*Medical Treatment of Acute Hæmatemesis.*

As regards the medical treatment of acute hæmatemesis, the important points were: (1) Absolute rest in bed; (2) Tripier's hot-water injections by the rectum (saline at 120°–130°F.); (3) an ice-pack to the abdomen; (4) nothing given by the mouth for at least four days, milk diet for two months, when some diluted beef essence might be added to the dietary; (5) small doses of morphia were valuable; (6) daily subcutaneous injection of a 10 per cent. solution of sterile gelatin in 40 c.cm. doses; (7) if vomiting or hæmatemesis continued the stomach should be washed out very gently with warm water, and after the lavage a dose of crystalline bismuth subnitrate given through the tube. It used to be taught that in hæmorrhage from the so-called acute ulcer, subsequent operation was unnecessary unless bleeding recurred, but the only safe rule was that an acute hæmorrhage required surgical treatment to prevent recurrence. The interval between the hæmorrhage and operation should be at least three months; if the patient was still anæmic transfusion of blood before operation was a valuable adjuvant.

*Chronic or Recurrent Hæmatemesis.*

For chronic or recurrent hæmorrhages operation should, as a rule, be deferred for two or three months after the last hæmorrhage, according to the patient's condition, medical treatment being carried out meanwhile. In large excavating ulcers, septic processes in the ulcer might play a considerable part in causing the hæmorrhage, so that it was important not only to rest the stomach but to keep it clean. If, *in spite of absolute rest*, there was further recurrence, operation might be considered, although personally he had never had to depart from his usual practice of delaying operation for two or three months. Operation, if decided upon, should be preceded by blood transfusion. There would probably be considerable difference of opinion as to the nature of the operation which should be performed for recurrent hæmorrhage. Ligature of arteries, excision of the ulcers, cauterising the ulcer combined with gastro-jejunostomy and partial gastrectomy had been employed; personally, he still pinned his faith to gastro-jejunostomy.

Some objected to gastro-jejunostomy on the ground that it was an indirect method of treating hæmorrhage, but it was the simplest surgical procedure to adopt, and had the great advantage that one started with a definite plan and was not tempted to do an extensive exploration which might turn the scale against recovery. If it failed it was time enough to adopt more drastic measures. He had had, alone or with Dr. Fenwick and Dr. Porter Parkinson, 84 cases in which there were recurrent attacks of severe hæmatemesis. In 82 of these hæmorrhage was due to a gastric or duodenal ulcer, and in all gastro-jejunostomy was performed. There were three deaths in this series, so that adding the 38 cases of gastro-jejunostomy before mentioned, there were three operative deaths in 120 operations, a mortality-rate of 2·5 per cent. In 4·2 per cent. there was a recurrent hæmorrhage of a trivial character, and in 90 per cent. no further hæmorrhage occurred after gastro-jejunostomy. He submitted that these figures justified the treatment adopted. He would offer one word of advice to his younger hearers: When called upon to treat a patient with hæmatemesis, they should take their courage in both hands and trust nature.

*Discussion.*

Sir WILLIAM WILLCOX said that no definite rule could be laid down for the treatment of severe gastric and duodenal hæmorrhage; the ætiology of each case must be separately considered, and treatment based on the provisional diagnosis. Some of the most severe hæmorrhages he had seen were in cases of cirrhosis of the liver, gastrostaxis, &c., in which the treatment usually adopted for a bleeding peptic ulcer might be contra-indicated. Certain principles of treatment might, however, be laid down, such as rest of the stomach and duodenum; he agreed with Mr. Paterson as to the danger of operation in the acute stage. Nothing should be given by the mouth for the first two or three days, or four or five days if hæmorrhage had been severe. With regard to local applications, he doubted whether the application of an ice-bag over the epigastric region was of much value. Morphine and its derivatives were undoubtedly useful; morphine was a powerful remedy for the control of peristalsis, but where hæmorrhage resulted from hepatic cirrhosis (due to alcohol, syphilis, &c.) the patient was strongly susceptible to the toxic action of these remedies, and the ordinary dose of ¼ gr. of morphine might cause death. Hepatic cirrhosis, and also chronic nephritis, contra-indicated the use of morphine; signs of hepatic or renal insufficiency should be sought before recourse was had to this drug. Another important factor in treatment was the promotion of the power of coagulation of the blood. He had adopted as a routine measure the intramuscular injection into the buttock of 1 gr. calcium chloride dissolved in 100 minims of distilled water. Serum injections were also useful; when a toxic cause was suspected, anti-streptococcic serum should be given. Blood transfusion was also of great value in counteracting hæmorrhage, and in some cases inhalations of carbon dioxide had been used with success.

Mr. A. H. BURGESS divided gastric and duodenal hæmorrhage into two types, one post-operative, the other arising from disease and independent of any operative procedure. Post-operative hæmorrhage followed operation (*a*) upon the stomach or duodenum, or (*b*) upon some other part of the body. In the former case prevention was more satisfactory than cure, and he stressed the importance of two points of technique: (1) All large vessels approaching the line of incision of the stomach should be under-run

with a suture and ligatured; and (2) the inner continuous layer of suture, taking up all the coats, should be closely applied, the needle passing ten times to the inch, and being drawn tightly. After gastro-enterostomy or partial gastrectomy, if the patient vomited, the vomited matter would always contain blood more or less altered, and usually already dark brown in the first vomit. If hæmorrhage continued the vomit would be brighter red; if this colour persisted and was associated with a rising pulse-rate some treatment should be adopted. He had seen three cases only which gave anxiety on the score of immediate post-operative hæmorrhage; the latter had ceased after the introduction of very hot water into the stomach—a method first introduced, he believed, by Rodman. The only fatal case he had had was after gastro-enterostomy for irremovable carcinoma of the pylorus; the main stem of the pyloric artery was shown post mortem to have been eroded in the floor of the malignant ulcer. Post-operative hæmorrhage after operations elsewhere than in the stomach and duodenum was rare, but had been met with after operations on almost all the abdominal viscera, and also elsewhere in the body. The mortality was high, having been put at 55 per cent.; the ætiology was obscure, but Rodman's view of a septic origin was generally accepted. Gastric or duodenal hæmorrhage other than post-operative might be grouped as associated, or not associated, with any gross local lesion in either viscus. Profuse hæmorrhage (gastrostaxis) might occur in the absence of such a lesion. He had three times operated for severe hæmatemesis without finding any gross lesion of stomach or duodenum. He had concluded that severe hæmorrhage from these viscera should not be surgically treated unless previous knowledge of the case, or definite relation of pain to the taking of food, pointed to a gross local lesion. Profuse hæmorrhage from chronic gastric ulcer was usually either quickly fatal from erosion of a large artery, or, if once arrested, did not tend to recur soon and repeatedly, as did that from a duodenal ulcer. He had no belief in "indirect" arrest of hæmorrhage by gastro-enterostomy. If operation were undertaken at all it should be a direct attack on the bleeding ulcer—its separation from pancreas or liver, and its destruction by excision or cautery.

Dr. A. F. HURST believed that hæmorrhage from gastric and duodenal ulcers was far less often fatal than was generally supposed. He had never had a case where death resulted, and only once had he had to call in a surgeon to save the patient's life. Dr. J. J. Coneybeare had investigated the post-mortem records of all cases of fatal hæmorrhage from gastric and duodenal ulcers (in the absence of cirrhosis of the liver) at Guy's Hospital between 1911 and 1920 inclusive. The total number was 23—i.e., 2·6 deaths a year if allowance was made for the fact that no post-mortem examinations were made in 12 per cent. of patients dying in the hospital. The 23 autopsies constituted 0·37 per cent. of the total number performed in the ten years. Only 13 of the 23 died from hæmorrhage without having undergone some previous operation; as about 600 cases were admitted, during the period in question, for hæmorrhage from an acute or chronic ulcer, the mortality of severe gastric and duodenal hæmorrhage was about 2·5 per cent. The most important factor favouring the cessation of this hæmorrhage was complete immobility; the patient should be reassured about his condition, and should be given repeated doses of morphia to keep him drowsy. Complete starvation for 48 hours should be secured, after which the ordinary strict treatment with diet, alkalies, belladonna, and olive oil should be begun. When hæmorrhage was severe, the rapid distension of the stomach resulted in more or less complete evacuation by hæmatemesis, followed by contraction, which might cause the hæmorrhage to cease. He used ice-cold water to empty the stomach. The danger of recurrence depended upon the digestion of the clot by gastric juice, the secretion of which was called forth by blood as by any other food. For this purpose alkalies must be given, which did not, like sodium bicarbonate, stimulate the secretion of more juice after neutralising an equivalent amount of acid, or give off large quantities of carbon dioxide, which distended the stomach and stimulated peristalsis. Oxide of magnesia was almost ideal from that point of view; it was most conveniently given as emulsio magnesiæ (B.P.C.). At the earliest possible moment after a hæmorrhage the patient's blood should be grouped and a donor found and kept at hand. Hæmoglobin estimation should always be done. He believed that the only indication for operation in the acute stage was severe and persistent hæmorrhage in an elderly person, with a long history pointing to the presence of a chronic ulcer, whose arteries were too degenerated for satisfactory plugging by thrombosis. Neither the occurrence of hæmorrhage in the past, nor the danger of future hæmorrhage in a patient who had not previously bled, should be regarded as indicating surgical rather than medical treatment for a chronic ulcer. The only definite indications for surgery were, in his opinion, perforation, hour-glass contraction, and pyloric obstruction, neither of which should ever occur, in his opinion, with early diagnosis, strenuous and prolonged treatment, and proper after-treatment.

Mr. R. P. ROWLANDS thought that most physicians and surgeons were agreed that operation was necessary for repeated bleeding of a chronic or duodenal ulcer. About 25 per cent. of these chronic ulcers caused obvious and severe bleeding; the latter was not the direct cause of death in more than 2 per cent., but by lowering the vitality it was an indirect cause. With an acute ulcer (particularly in a young person) there was every hope that thorough medical treatment would effect a cure, but recurrent hæmorrhages constituted a different class; when there was good evidence of a chronic gastric or duodenal ulcer, operation should be performed. Nowadays, expert radiography hardly ever failed to discover the crater of an ulcer, or a deformity due to it. The ulcer itself must be attacked; if the patient was very ill, the arteries should be tied and the ulcer invaginated with careful catgut sutures. A duodenal ulcer on the posterior wall should be cauterised, and gastro-duodenostomy should be done in preference to gastro-jejunostomy. It was a bad thing to operate during hæmorrhage, but hæmorrhage must not be said entirely to contra-indicate operation.

*Resumed Discussion.*

The discussion was then adjourned. On its resumption Dr. ROBERT HUTCHISON (President of the Section of Medicine) took the chair.

Dr. IZOD BENNETT noted that all the speakers had emphasised the fact that immediate treatment of all acute cases of gastric and duodenal hæmorrhage should be left in the hands of the physician. Cases were, however, continually sent into surgical wards of hospitals, showing that students and newly-qualified practitioners believed that a surgical treatment existed. Further to emphasise the fact that treatment was medical he enumerated four points: (1) The diagnosis was often very obscure; (2) the object of urgency was the prevention of the patient's immediate death, and of 61 cases he had examined post mortem 25 had died as a result of perforation, 13 from hæmorrhage, and 23 as a result of surgical intervention, so that operation caused more deaths than did hæmorrhage; (3) the patient after a severe hæmorrhage was not in a condition to stand the shock of operation; and (4) in the series referred to, hæmorrhage was responsible for 21 per cent. of all deaths due to gastric and duodenal ulcer. The mortality in cases medically treated was less than 5 per cent. Some kind of resection was the commonest form of surgical treatment to-day; not enough operators had given results of surgical treatment for any just comparison to be made, but unless such results showed a mortality below 5 per cent., resection operations were not justified. Absolute rest and prolonged starvation by the mouth were necessary in medical treatment; gastric lavage

he considered dangerous. Intravenous administrations of blood or saline were to be avoided, on account of the danger of raised blood pressure. When the probability of hæmatemesis was past, the problem changed, and the fact of hæmatemesis having once occurred might be an additional reason for surgical treatment.

Mr. G. GORDON-TAYLOR said that surgical treatment of acute ulceration of the stomach was never required, but chronic ulceration was a different matter. Some cases of elusive ulceration of stomach or duodenum seemed to be absolutely fatal diseases, because of the erosion of arteries. Treatment should be prophylactic, before the ulcer attained sufficient size to produce fatal consequences. Once a particular hæmorrhage had started it was wise to wait until it ceased, and then interfere as soon afterwards as possible, remembering that erosion of a large artery might occur very soon. He had operated when hæmorrhage was actually taking place, and had succeeded in several cases in a direct attack upon the ulcer as soon as hæmorrhage had stopped. The operator should be amply provided with all available methods of resuscitation, including facilities for repeated blood transfusion.

Dr. P. HAMILL described arrest of the hæmorrhage as the fundamental therapeutic principle. Gastric or duodenal hæmorrhage differed from hæmorrhage from the surface of the body in that one only knew that the patient had bled, and that the bleeding-point was not susceptible to pressure. He had never seen an immediately fatal case. Treatment, assuming a diagnosis of hæmorrhage from an ulcer, was of a patient who had bled, might be bleeding, or might bleed again. Complete tranquillity of the patient was necessary, and contraction of the musculature of the stomach could be aimed at. He believed that an ice-bag did help to arrest hæmorrhage; it undoubtedly eased the patient's mind by relieving soreness. The administration of chalk combined with magnesia was useful for the promotion of coagulation at the bleeding point. As regards the washing out of the stomach with cold water, he had had no occasion to use a method so drastic. The stomach-tube did not enhance tranquillity. Treatment was essentially medical, but cases occurred where surgical measures might be required; many of these were duodenal, and some were in elderly persons with sclerosed vessels, the ulcer perforating through into a vessel.

Mr. C. H. FAGGE could not agree with previous speakers concerning the danger of gastric and duodenal ulcers. He had seen W. J. Mayo excising duodenal ulcers, and since that time had himself excised every gastric or duodenal ulcer when there had been hæmorrhage. Some operation dealing directly with the ulcer was, in his opinion, the right thing. In the past few years he had seen two patients who died of hæmorrhage whilst surgical treatment was being considered. He had recently operated on a patient for a medical colleague who thought surgical treatment offered the only chance of saving the patient's life. He had opened the abdomen after blood transfusion, and had found a thickened pylorus, and a large ulcer on the lesser curvature, which he excised, discovering a large vessel in its base; he did not believe that medical means could have stopped that hæmorrhage. He had hoped to learn something regarding hæmoglobin estimation—what to do in cases where rest and other treatment failed to raise the hæmoglobin beyond 30 per cent., and whether it was then wise to interfere surgically.

Prof. G. E. GASK said that until three years ago he would have endorsed Mr. Paterson's opinion concerning the treatment of a patient bleeding from a gastric ulcer, but since that time his opinion had been changing. He had seen, post mortem, cases that had died of hæmorrhage with large open vessels in the ulcer. No medical treatment could stop hæmorrhage in such cases; ligature was necessary. Transfusion was very valuable. The technique of gastric surgery had improved, and he now believed that a certain number of these cases could be saved by surgery. The ideal thing was that gastric and duodenal ulcers should be prevented, but, as things were, they had to deal with a certain number of moribund cases of these conditions. He instanced a case where a hard, firm blood-clot distending the stomach, had to be removed by hand. He could not agree with Dr. Bennett that transfusion made patients more likely to bleed.

Mr. GARNETT WRIGHT said that all records of cases of hæmorrhage not due to ulcer should be removed from the discussion, for they falsified statistics. Diagnosis of these ulcers depended on the clinical history. Medical treatment was proper in the first instance, but in some cases hæmorrhage recurred repeatedly, and it became their duty to estimate which patients might be operated upon. He had operated in seven cases, with three deaths and four recoveries; he had never operated after a single hæmorrhage, and thought operation should, if possible, be deferred until bleeding stopped.

Dr. HUTCHISON, speaking from the chair, said that certain things had emerged from the discussion. One was that hæmatemesis was not considered to be very dangerous; he thought some speakers had tended to under-estimate that danger, having himself seen many fatal cases of hæmatemesis. Another point was the importance of accurate diagnosis. Surgery had been narrowed down to cases of hæmorrhage for chronic ulcer of stomach or duodenum. He believed that there was no medical treatment for hæmatemesis, beyond keeping the patient quiet. He had never dared to wash out the stomach and run in adrenalin, &c. Most of the earlier speakers had opposed surgical treatment of hæmorrhage from gastric and duodenal ulcers, and some of the later speakers had urged that some of these ulcers should be directly attacked. He believed that with modern facilities it should be possible to make a direct attack on the bleeding point.

Mr. PATERSON briefly replied.

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## JOINT MEETINGS OF THE SECTIONS OF THE STUDY OF DISEASE IN CHILDREN, NEUROLOGY, OBSTETRICS AND GYNÆCOLOGY, AND ORTHOPÆDICS.

### BIRTH INJURIES.

A MEETING of these sections was held on March 6th, Dr. CUTHBERT LOCKYER presiding, when a discussion on Birth Injuries, with Special Reference to Intracranial Injuries with Hæmorrhage, and to Nerve Injuries, was held.

Mr. EARDLEY HOLLAND, who opened the discussion, drew attention to the astounding frequency of intracranial injury in cases of stillbirth and of neonatal death. This was a disturbing fact for obstetricians, since in so far as the injuries were mechanical in origin, they were largely preventable. The conditions were not always immediately, or even remotely, fatal, and there was reason to suspect that those children who survived might bear the stigma of birth trauma in the form of various nervous and physical maladies. The frequency with which hæmorrhage had been found varied, according to different observers, between 21 per cent. and 55 per cent. of cases of stillbirth and neonatal death examined, the last-named figure being that found by Mr. Holland. Hæmorrhage might be (1) subdural, (2) ventricular, (3) in the cerebral substance. Again, it might be severe, moderate, or slight, and was often diffuse rather than localised. Subdural was commoner than ventricular hæmorrhage. As to its ætiology, the hæmorrhage might be (*a*) traumatic, or (*b*) asphyxial. Traumatic hæmorrhage was usually accompanied by tears of the tentorium cerebelli or falx cerebri, and asphyxia by the signs of fœtal asphyxia, but this distinction did not always hold, because many cases with tears were accompanied by fœtal asphyxia. Possibly the initial traumatic hæmorrhage caused circulatory disturbances that led to severe asphyxia, and it was also likely that asphyxia was an important contributory cause of traumatic hæmorrhage, since engorged blood-vessels were more

likely to be ruptured by a superadded mechanical strain.

*Traumatic Hæmorrhage.*—To appreciate the mode of origin, it was necessary to know how the fœtal head behaved when acted on by the forces of labour. The fœtal head was a fragile object, which displayed a remarkable combination of qualities which enabled it to resist injuries, with defects which disposed it to suffer them. The wonder was the large number of fœtuses that reached the world alive and uninjured. Cranial stress consisted of two elements: (1) General compression of the whole head, and (2) simple longitudinal compression. The alteration of shape was brought about partly by the displacement of the plastic bony vault as a whole, and partly by the bending of the individual bones which compose it. Mr. Holland showed slides illustrating how the dura mater septa are attached to the cranial bones, forming a close arrangement of stays or ligaments. When the head alters its shape, alterations in tension of the septa are inevitable owing to the nature of the attachments to bones. Excursion and bending of bones is resisted by the tension of the septa, just as the swaying of a mast is resisted by the tension of its stays. If the alteration in shape is too great, the septa tear and this permits more extreme alteration in shape, and dangerous disturbances in other intracranial contents. These septa exert a protective function against excessive alterations. Support was lent to this theory by the special strengthening bands and fibres arranged on lines where stress is likely to fall. Tearing of the tentorium and falx was clear evidence of excessive cranial stress and formed the best and simplest means of estimating its degree. Tears lay in the area of greatest stress, usually at the free border of the tentorium near the junction with the falx, less commonly in the falx. All degrees of tear might be present. These bands acted as a restraining influence in keeping the fœtal head symmetrical, and when one was badly torn, the head sometimes became oblique. Tears were found by Holland in 48 per cent. of stillbirths, and by other observers in percentages varying from 24 to 60. Schaefer found them in 91 per cent. of stillbirths after difficult forceps delivery.

*Mode of Origin and Source of Hæmorrhage.*—The actual tear was not dangerous. Mr. Holland's view was that hæmorrhage mostly came from the vein of Galen or its tributaries, since any movement of the apex of the tentorium was necessarily transmitted to this vein, whose fixed point was at its entrance to the straight sinus, but this was, of course, not the only source of hæmorrhage. Circumstances which determined excessive cranial stress were (1) disproportion between the head and the fundus, or deficient flexion and great rigidity of separate parts, (2) forceps, if used too early with too great force, or if delivery were too rapid. Misplacement of forceps might cause damage, and the use of forceps to deliver a premature fœtus had its dangers. It was of great importance whether the stress was gradual or rapid—for example, tearing was found in 75 per cent. of dead fœtuses delivered by breech, and F. J. Browne stated that this injury was 15 times more likely to occur in breech than in vertex presentations. Similarly, rapid birth, spontaneous or following pituitary, was also dangerous. A soft and plastic premature head was more likely to suffer injury than the firm head of the full-term child. The fact that tearing of tentorium and hæmorrhage could occur after apparently a normal labour, was difficult to explain; possibly some of these cases were caused by a too zealous guarding of the perineum, especially by strong forward pressure forcing the occiput against the symphysis.

*Fœtal Asphyxia and Intracranial Hæmorrhage of Asphyxial Origin.*—When the circulation in the cord was obstructed or the placenta separated or degenerated, fœtal asphyxia resulted, and if it continued long the fœtus died. Post-mortem signs of asphyxia were found in 30 to 40 per cent. of fœtuses who had died during labour. Observers differed in regard to the relative frequency of traumatic and asphyxial hæmorrhage. In Mr. Holland's series of 92 cases he placed 75 as traumatic, 17 as asphyxial. Post-mortem differentiation was not always possible, and often the conditions coexisted.

*The Pediatrician's Standpoint.*

DR. H. C. CAMERON discussed first the symptomatology of subdural hæmatoma in the newly born. In almost all cases there was a bulging fontanelle, and the cerebro-spinal fluid was under high tension and blood-stained. The ophthalmoscope in almost half the cases was said to show punctate hæmorrhages, more rarely œdema of the disc. An increased rigidity and spasticity of limbs, often with opisthotonos and trismus, was common, and either generalised convulsions or localised twitchings. There might be somnolence or coma, or persistent crying and restlessness with all the appearances of pain. Some interference with the respiratory rhythm was the rule. There might be asphyxia at the moment of birth, and respiration, when established, might remain shallow and halting. The suction reflex was often absent. It was clear that the life of such infants was precarious. Of Dr. Cameron's eight cases all were fatal, but he was convinced that in cases of lesser severity the condition was compatible with life. So long as our powers of diagnosis only enabled us to recognise the severest grade the doubt must exist. He advocated the routine use of lumbar puncture and of the ophthalmoscope in the newly born and a careful clinical examination, now often confined to noting the colour of the fæces. If recovery took place the long latent period before further symptoms developed might be accounted for by the fact that the pyramidal tracts only gradually become medullated during the first year; delay in the transition from the spastic uncontrolled movements characteristic of the newly born to that degree of voluntary control of lips, tongue, hands, and feet which the normal infant achieves might not be obvious to the parents until the failures to walk or grow at a year or more proclaimed it. The infant whose cortex had been damaged lagged far behind the normal in development upon the sensori-motor side, and infantile education proceeded largely along these paths; the initial delay in development was much greater than the ultimate loss. In later childhood improvement might be rapid. Dr. Cameron dwelt on the high plane of general character and power of concentration found in these children, and the improvement in mental condition following orthopædic treatment. They formed a group apart, which seemed to him clearly separated from cases of spastic idiocy due to a developmental deficiency of cortical neurones. That Little was right in contending that the cause was to be found in cortical hæmorrhage at birth, he believed strongly, although this condition might not be the only or invariable result of such an accident.

DR. JAMES COLLIER said that he could conceive of recovery from hæmorrhage in nearly every one of the regions demonstrated by Mr. Holland, except from hæmorrhage in the brain substance. The origin of infantile spastic paraplegia from meningeal hæmorrhage was now discredited, though some few infantile spastic states might result from asphyxia. It remained to be considered why abnormalities at birth were associated with spastic diplegia. He had set out fully in his presidential address to the Neurological Section[1] his view that both these conditions were expressions of a deeper-lying pathological influence which had disturbed the mysterious relationship between mother and child. He then briefly reviewed the history of the supposed connexion of birth injuries with infantile spastic paralysis. He pointed out the common occurrence of varying degrees of subarachnoid hæmorrhage in the infant during the process of birth and argued that minor degrees of such hæmorrhage are unassociated with any detriment to the child, while major degrees had an especial symptomatology. He criticised the opinion that asphyxia neonatorum is dependent upon meningeal hæmorrhage.

[1] THE LANCET, 1923, ii., 1129.

### *Birth Palsy.*

Mr. H. A. T. FAIRBANK said that in his series of 98 cases (males 56, females 42) 93 were unilateral and 5 bilateral, making a total of 103 arms paralysed. The evidence seemed to point strongly to the traction theory as being the correct explanation of the paralysis, if by traction were meant any position which involved deviation of the head away from one shoulder, which necessarily put strain at the upper cords of the brachial plexus, as well as direct traction of the arm, which was only exceptionally the cause. His reasons for favouring the traction theory had been set out in the *Journal of Orthopædic Surgery* (vol. ii., No. 5, May, 1920). Birth palsy was about four times as common in head as in breech presentations, the figures in his series being 71 vertex and 19 breech, two in which turning forceps were employed, while in six no details of the birth were obtainable. As a rule, but not invariably, labour had been difficult, and instruments had been used in half the cases. Of six plexuses explored, in five he had found evidence of more or less serious damage to the fifth and sixth cervical nerves. The paralysis was usually of the upper arm type, affecting the muscles supplied by these nerves. The vast majority of cases recovered more or less completely, certainly to an extent which contra-indicated operation on the plexus. The typical palsy was well known. Obvious signs of recovery were usually present three months after birth when the case had been properly treated. The treatment consisted in leaving the arm in a position which relaxed paralysed muscles, and daily massage and passive movements of all the joints to prevent contractures. The most important was the use of a splint (which was demonstrated) to hold the arm abducted at the shoulder and the forearm vertical and supinated. These cases showed a marked tendency to contractures, probably due to want of voluntary activity, in spite of the recovery of the paralysis. If there were no signs of recovery in three to six months, confirmed by electrical stimulus under an anæsthetic, the plexus should be explored. Nerve-grafting has been tried without real benefit; nothing but secondary suture of the nerves, or excision of scarred portions, followed by suture, was of any use.

*Posterior Subluxation of the Shoulder-joint*, by no means rare in children, was secondary to the paralysis, and was inevitable if the case was untreated. The subluxation did not develop unless a considerable degree of recovery had taken place. The deformity consisted in slight flexion and abduction of the humerus with marked internal rotation. External rotation was impossible, and this prevented the power of supination from being made use of; in fact, the hand was hardly used at all. The cases in which the displacement was reducible were treated by daily manipulations, and the use of the same splint as is used in the paralytic stage. In irreducible cases forcible attempts at reduction under an anæsthetic were unsatisfactory, and the method of choice was by open operation, the division of the junction of the subscapularis muscle, and the contracted anterior part of the joint capsule. Mr. Fairbank said that he now fixed the arm in abduction after operation, and in external rotation, and replaced the plaster cast after three or four weeks by a metal abduction splint which allowed of massage and active and passive movements. Although the other movements of the shoulder might show little improvement, outward rotation was always possible after operation, and this allowed the hand and forearm to be used. The tendency to adhesions and contractures of all joints, not only of the shoulder, still persisted in these children and had to be kept constantly in mind.

### *The Localisation of Hæmorrhages into the Brain Stem.*

Dr. THOMAS LUMSDEN described the effects of hæmorrhage into the brain stem experimentally produced in mammals. It was reasonable to assume that hæmorrhage into the infantile brain stem must have similar results, and this had been confirmed by serial sections of two human brain stems into which hæmorrhages had occurred at or just after birth. The results observed corresponded accurately with the experimental findings. Before death these infants showed the type of breathing described as apneustic.[1] The effects of serious hæmorrhages at the levels of origin of the fifth, eighth, and tenth cranial nerves were found to correspond exactly with the results of section of the brain stem just below the level into which the hæmorrhages took place. The alteration in the position of the cephalic contents sometimes occurring during birth, which Mr. Holland had described, must involve a considerable alteration in the position of the brain stem, and here was a possible explanation of the occurrence of deep hæmorrhages. By noting certain alterations in the character of the breathing it was possible to predict ante mortem the exact level of the damaged area and to have some grounds upon which to base a prognosis, and Dr. Lumsden described the experimental evidence for the existence of four respiratory centres, which enable us to locate hæmorrhages into the brain stem. If after an intracranial hæmorrhage the normal type of breathing continues we may conclude that there is no serious injury to the brain stem. If the respiration is apneustic in type the hæmorrhage is in the pons. If only expiratory spasms and gasping occur the damage is at the level of the striæ, and if gasping alone is seen then the dominant hæmorrhage is just above the "noeud vital," near the apex of the calamus scriptorius. As to treatment, this must be immediate if it is to be of any use. In animals artificial respiration was most effectively achieved by pumping or blowing into the lungs oxygen to which 5 per cent. of $CO_2$ has been added, the latter in order to stimulate the respiratory centres. If the heart had stopped cardiac massage must be instantly performed.

As to prognosis, the lower down the brain stem the more serious were the effects of hæmorrhage, but recovery was possible whatever the level affected if the hæmorrhages were small and not very numerous. If in the cat the heart stopped so that the cerebral circulation ceased, unless it could be restarted within five minutes the cerebral hemispheres would not revive. If the circulation had ceased for 15 minutes the whole of the brain stem was irrevocably dead. So that while in the cat the heart might be restarted by massage and injections even after it has ceased beating for an hour or more, the central nervous system had been long dead, and could never resume its activity though the heart might continue to beat for several hours. It seemed probable that in man these viability periods (5 to 15 minutes) would be yet shorter than in the cat, so that most of the cases of attempted revival reported in the press were of necessity quite hopeless and unavailing.

Dr. GILBERT STRACHAN said that in 100 cases of stillbirth examined by him dural laceration was found in 23, and in 50 cases of neonatal death a similar lesion was present in 12; the total was thus 35 out of 150 cases of stillbirth or neonatal death, approximately 23 per cent. The laceration was accompanied by hæmorrhage of varying degree in 26 out of 35 cases in which tears had been found. In a number of cases in this series the bleeding did not appear to be sufficiently extensive for such an origin as Mr. Holland suggested (vein of Galen), since the hæmorrhage was represented by only a little clot. Dr. Strachan also found the liability to tentorial laceration, which was by far the commonest cause of intracranial hæmorrhage, was markedly increased in breech presentations, and emphasised the desirability of prophylactic external version in all breech cases, especially in primiparæ. In some of the neonatal cases who lived from one hour to

[1] An apneusis is a prolonged inspiratory tonus or holding of the breath. A gasp is a sudden involuntary incoördinated inspiration. Dr. Lumsden,s researches are published in full in the Journal of Physiology, lvii., 153 and 353; lviii., 81 and 111.

four days the infant presented no abnormality at birth, and death in these cases usually occurred suddenly. Generalised twitchings and convulsions were seen in a number of cases, in others inability to suckle, while a drowsiness deepening to coma was present. In the majority of cases under discussion obstetrical difficulty was present in varying degree.

Dr. BERNARD MYERS described briefly the case recorded by himself and Dr. W. D. Kirkwood in THE LANCET of July 14th, 1923, which supported the experimental evidence given by Dr. Lumsden. He pointed out that since this condition was not well recognised medico-legal trouble might arise, and it should be borne in mind when the case against the parents or nurse looked suspicious.

Mr. D. M. AITKEN gave instances of the immense benefit to children with spastic paraplegia, not only in their physical but in their mental condition, which followed re-educative treatment by orthopædic surgeons.

Mr. BRIGHT BANISTER said that from the obstetrical standpoint three considerations arose: (1) the causation of injuries; (2) the fatalities attending them; (3) the possibility of their prevention. As to causation, he agreed with Mr. Holland that no such hurry as had been at one time taught was essential in the delivery of living babies in the breech presentation. It was unnecessary and dangerous to attempt to deliver the head in under five minutes from the time of the birth of the umbilicus. In one case in his experience 14 minutes' interval had elapsed and the infant breathed normally after a few minutes. As to causation of birth palsy, traction exerted on the head after birth in order to deliver the anterior shoulder was a point not to be forgotten. Too much force used here might well cause injury. As to prevention, the obstetrician could only continue his irksome duty of urging practitioners to forestall difficulties instead of waiting to overcome them.

## SECTION OF LARYNGOLOGY.

### SUPPURATIVE DISEASES OF THE SINUSES.

A MEETING of this section was held on March 7th, under the presidency of Mr. H. J. BANKS-DAVIS. Instead of the usual clinical meeting, a discussion was held on the subject of Suppurative Diseases of the Frontal, Ethmoidal, and Sphenoidal Sinuses.

Mr. MUSGRAVE WOODMAN introduced the subject. He said suppuration of the sinuses enumerated in the title constituted border-line territory. Above it the physician held sway, and often confirmed his diagnosis on the post-mortem table. From below the rhinologist looked up along the dark passages and around corners. Between the two lay a territory as yet very imperfectly explored. Such could only take place by collaboration and accurate histological examination on the part of those who dealt with either side. Comparison of the frontal sinus with the gall-bladder was an apt one: it was a cavity drained at its lowest part by a tube leading to a larger cavity, and its illnesses largely depended on the conditions in the duct and the morbid processes which surrounded that duct. Dr. Logan Turner was insistent that before any operation on the frontal sinus was contemplated a complete X ray examination should be undertaken to disclose its pathological anatomy. Frontal abscess, of which he was exhibiting a specimen, was a somewhat rare complication. An important complication was osteomyelitis, which was well known as a sequel of any operation in the region of the frontal sinus; it did not arise after operations on the antrum, and but rarely in connexion with procedures on the ethmoid. The mucous membrane lining was continuous with that of the nose, the bony walls were continuous with the nasal sinuses, and the abnormality was in the blood supply. There were no veins in the frontal sinus itself. The free anastomosis existing between the angular veins, the superior longitudinal sinus, and the emissary veins of the meninges, suggested it was the vascular connexion which had much to do with the occurrence of osteomyelitis in the frontal sinus. With regard to neuralgia of the frontal sinus, many of these cases did not come to the rhinologist. One case he quoted was that of a man who was well until five years ago, when he began to have nasal catarrh. Every winter thereafter he had a sense of oppression and discomfort over the right side of his forehead. Last winter it culminated in a violent attack, and he sought advice. Mr. Woodman at the operation found pus in the frontal sinus under considerable tension.

Concerning the methods of treatment of frontal sinus conditions, those who knew the intranasal approach to the sinus were aware of the cases in which that was suitable and what were its limitations; they also knew its complications. But it was very desirable to know, without bias, what type of case was most suitable for the external operation. The best type of external operation had now been placed beyond question; it was that devised by Mr. Walter Howarth, a member of the section. Mr. Woodman regarded it as a perfect operation. Was an external operation necessary in all cases? What were its complications? Did osteomyelitis arise from it? It was less likely to arise as, by this operation, the bone was approached through the floor. It was desirable also to know what were the results of the operation and the difficulties of drainage which had been encountered. With regard to the ethmoid bone, it was a spongy bone, and a source of permanent and late infection. Infection spreading up the nose receded again and left infecting organisms in the loculi. The ethmoid was divided obliquely into an antero-inferior portion and a postero-superior portion, which were distinct, influencing respectively the frontal sinus in front and the sphenoidal fissure behind. The normal ethmoid bone had a large number of perforations, due to the passage through it of vessels. The difference between the dura mater and the floor of the anterior fossa of the frontal sinus was very considerable. Frontal suppuration would cause extra-dural abscess, or frontal lobe abscess, but it did not often cause generalised meningitis. He had seen two cases of encephalitis lethargica in which every sinus in the head was full of pus, and the patient seemed to be dying. The physician and neurologist were met in consultation, but no post-mortem examination was allowed. A series of investigations were much wanted on these meningitis cases which died following sinus involvement; many of them had had persistent sinus trouble which had been unsuspected.

Mr. Woodman said he was convinced that cavernous sinus thrombosis arose primarily from the ethmoid, not from the sphenoid. It would seem to be the right treatment to start a complete exenteration of the ethmosphenoid on one side, and so approach the cavernous sinus and turn out the clots. In the ethmoid a subtle form of neuralgia was met with, and its origin was apt to be missed. He related a case of it. It was desirable to know whether it was necessary to remove all the ethmoid cells, or whether the opening up of a certain number was sufficient. In the former event he discussed the best procedures. The sphenoid was a plain cavity; he showed a slide of it, indicating the close proximity of the palatine ganglion, the vidian nerve, and the middle turbinate bone to each other. The slide showed how disease in the posterior cells could exert its bad influence. The sphenoid he considered was more often maligned than it deserved to be; the source of trouble was more often the ethmoid. The importance of the sphenoid lay in its relationship to the optic foramen and the vidian canal. Sluder's experiments showed that the first and second divisions of the fifth nerve could be reached by cocaine, and therefore by sepsis and by drugs. He exhibited slides to illustrate the danger of operating on the ear for sphenoidal disease when sphenoid pain was referred behind the ear. Suppuration in the sphenoidal cavity might cause dilatation of the pupil and visual symptoms. In conclusion, Mr. Woodman referred to the connexion of the sinuses with the pituitary. It was now well known that a source of sepsis anywhere in the body had a marked influence on the

thyroid gland; therefore, in view of the permeability of the sphenoidal sinus by drugs, he asked whether it was not probable that in latent or active infection of that sinus the pituitary itself would be infected. He thought there was a wide field for research in connexion with the pituitary gland; and that meningitis and neuralgia also stood in need of a good deal of investigation.

Dr. W. T. GARDINER gave a clear description, with the aid of lantern slides, of the method carried out by Sluder in opening the ethmoid and sphenoid intranasally. It was carried out under local anæsthesia.

Dr. DOUGLAS GUTHRIE described his efforts to ascertain the degree of friability of the cribriform plate, and its relationship to the anterior ethmoidal cells; also how easily the cribriform plate could be broken into. He found that the anterior part was the more easily penetrated. It constituted an argument for the Sluder operation. In 74 per cent. of 200 skulls he found the ethmoidal cells rose above the cribriform plate, and that the olfactory groove was deep; shallow in the remaining 26 per cent.

Mr. HERBERT TILLEY referred to cases of osteomyelitis of the frontal bone, apart from operations on the sinus. In opening the sinus externally he urged that no sharp curetting instrument should be used, because of the danger of opening some of the small diploe and allowing some infection to enter. Sphenoidal sinus diseases he considered to be very common. He discussed the whole subject at some length.

Mr. ERIC WATSON-WILLIAMS showed skiagrams of some cases of frontal sinus disease, and related their symptoms and treatment.

Dr. LOGAN TURNER (Edinburgh) said that last spring he sent a questionnaire on the subject of intracranial complications to the surgeons in this country, especially with reference to osteomyelitis. These complications were divided into two groups: (1) Spontaneous, (2) post-operative. There were 125 returns, of which 77 were spontaneous, 48 post-operative, the former occurring in patients under 30 years of age, in two the patients were under 10; 34 were complications of acute and subacute sinus suppuration, 40 complicated chronic sinus suppuration. It would be valuable if there could be returns of the percentage of complications which arose in sinus suppuration, so that they could be compared with the intracranial complications arising in aural suppuration. Complications occurred where one sinus alone was affected in 37 per cent. of the cases; where two or more sinuses were involved the percentage was 62. Of 71 cases the frontal sinus was involved in 41, the sphenoidal in 19, the ethmoidal in nine, the maxillary in two. The post-operative complications occurred mainly after operations for chronic sinus suppuration—namely, 89 per cent.; only in 10 per cent. of acute sinusitis. Osteomyelitis occurred in 58 per cent., and it was not by any means only a sequel of the external operation. He agreed it might be started after operations on the antrum. Osteomyelitis followed frontal sinus operation in three of eight intranasal operations, and in 12 of 20 frontal bone operations.

Sir STCLAIR THOMSON said that in his clinic there had been a considerable number of what he regarded as spontaneous cases of osteomyelitis, many of whom gave a history of having recently been in a swimming bath. These spontaneous cases responded favourably to operation, and in that particular were in favourable contrast to the others.

Mr. W. S. SYME expressed his satisfaction with the Sluder operation, and related his operative methods. He uttered a warning against perforating the sphenoidal sinus from the centre of the anterior wall; one should have great respect for the dura mater covering the floor of the cranial cavity. In dealing with the ethmoidal cell, the great need was thoroughness.

The PRESIDENT thought sinus cases were often operated upon in hospital too soon.

Mr. G. W. DAWSON agreed with the President.

Mr. WOODMAN, in reply, said he did not think that 50 years hence the Killian operation would be required or performed at all; he considered Mr. Howarth's operation far superior. With regard to the danger of meningitis in connexion with ethmoidal disease, he agreed it was a danger, but in one or two cases of malignant disease he had exposed the dura of the anterior fossa freely, and in one case he accidentally cut it, and cerebro-spinal fluid came out; but he stitched it up, applied iodine, and saw that it was well drained, and the patient did not even have a rise of temperature. The condition he had to deal with in that case was not only malignant, but also septic; he did not think malignant disease occurred in the upper part of the nose without sepsis. But the greatest care must be taken not to perforate the cribriform plate or any part of the floor of the cranial cavity.

A number of patients and specimens were shown by various members.

## ROYAL ACADEMY OF MEDICINE IN IRELAND.

### SECTION OF SURGERY.

*Surgical Treatment of the Stomach.*

A MEETING of this section was held in the Royal College of Physicians on Feb. 29th, Sir WILLIAM I. DE COURCY WHEELER, the President, being in the chair.

Mr. JAMES SHERREN delivered an address on Observations of Disease of the Stomach and Its Surgical Treatment, which was published in THE LANCET of March 8th.

The PRESIDENT said that the first question to be settled was the question of diagnosis of gastric ulcer. Surgeons often hesitated for sound reasons to make the diagnosis unless supported by a positive X ray picture. He alluded to the manner in which extra gastric lesions mimicked ulcer of the stomach, and pointed out that although hæmatemesis might be a brick in the diagnostic building, it arose from so many causes other than ulcer that it was by no means conclusive. He agreed that the association of chronic ulcer of the stomach with malignant disease was very definite and close, but thought it must be difficult to arrive at a figure representing the percentage of chronic gastric ulcers which became malignant. The President strongly agreed with the teaching of Mr. Sherren, Sir Berkeley Moynihan, and others in connexion with the necessity for partial gastrectomy in the treatment of many forms of chronic ulcer, and supported the view that the convalescence was uneventful and the mortality inconsiderable. A chronic ulcer left in situ, in healing, produced stricture of the pylorus, "hour-glass" stomach, stenosis of the cardiac end, or became malignant in perhaps 40 per cent. of cases—the figure given by Mr. Sherren. He recommended cauterisation by the Balfour method in small, easily accessible ulcers, with the addition of gastro-enterostomy, and a sleeve resection in cases where there was a fair amount of healthy stomach both proximal and distal to the ulcer. A union between the two segments gave good functional results. An indurated chronic ulcer at the pyloric end was treated by closure of the duodenum, partial gastrectomy, and anastomosis in front of the colon between the jejunum and the proximate segment. In one case, in order to get above a chronic ulcer in a woman aged 60, he was obliged to remove the entire stomach. He showed seven specimens of chronic ulcer and malignant disease of the stomach removed recently by partial gastrectomy. He had operated upon one case of gastro-colic jejunal fistula. Small ulcers with a free mobile stomach could be safely treated by gastro-enterostomy.

Mr. A. B. MITCHELL said that Mr. Sherren's wise paper almost disarmed criticism. One thing he had said

with which the speaker could not agree, was that the operation of gastro-jejunostomy was a cure for gastric ulcer. Mr. Mitchell was of opinion that in many cases of simple non-malignant ulcer gastro-jejunostomy would not effect a cure. The operation for gastric ulcer was a serious one. He would never put the operative risk in disease of stomach under 3 per cent. Even the simplest operation was sometimes borne badly by the patient. The idea of a perfect stomach was, he thought, one that was freely movable, and this was a condition which had got to be secured at operation. It was remarkable how little stomach a person required to live and to be healthy. The question of heredity was an interesting one. Mr. Mitchell quoted cases of family incidence. He believed that the ideal place for gastro-jejunostomy was the pre-pyloric pouch, as he thought the higher up it was done the less likely the patient was to have comfort afterwards. Sometimes a patient would remain well for perhaps ten years after operation and then would come back complaining of stomach symptoms. In these cases he always suspected peptic ulcers, and though after medical treatment the patients got practically well, they never had much comfort and generally came back for another operation. The so-called silent gastric ulcer occurred in patients who came into hospital with acute perforation, the result of a hard ulcer which must have been present for at least three years, and yet the patients said they had never had any symptoms whatsoever, neither indigestion, nor pain, nor anything else.

Mr. SETON PRINGLE confined his remarks to the discussion of the various operative measures for hour-glass stomach. He referred briefly to the diagnosis of the condition, laying stress on the importance of X ray examination. He exhibited slides illustrating the different methods he had employed in this condition, with, in many cases, X rays of post-operative results. In conclusion, he stated his belief that partial gastrectomy, where possible, was the most satisfactory operation, but that where this was not feasible a posterior gastro-enterostomy into the upper sac was the best procedure. Where the distal sac was large, or obstruction of the pylorus or duodenum also existed, he advised that a second stoma be provided from the distal sac into the same or another loop of jejunum. In cases of difficulty he had no hesitation in performing an anterior gastro-enterostomy, with or without an entero-anastomosis. He classed as unsatisfactory all direct attacks on the constriction. He regarded as essential the excision of an active ulcer should such be found at the operation.

Mr. R. C. B. MAUNSELL was absolutely in accord with most of what Mr. Sherren had said, and he was glad to hear him re-state that gastro-enterostomy would cure most gastric ulcers and all duodenal ulcers. This was a fact which was known and believed some years ago, but which lately had become unfashionable. He personally only performed gastrectomy in cases of malignant disease, and he thought that ten years hence this operation would not be known at all. Gastrectomy performed in cases of ulcers might justly be called over-operating.

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TUBERCULOSIS SOCIETY.—An ordinary meeting of this society will be held to-day (Friday), at 8 P.M., at the Margaret-street Hospital, Margaret-street, W., when Dr. Alex Sandison and Dr. Basil Price will read papers on the Tuberculosis Work of the Ministry of Pensions, Administrative and Clinical.

The annual provincial meeting will be held at Cambridge on April 10th, 11th, and 12th, when the following lectures will be delivered:—April 10th: Dr. Louis Cobbett, A Comparison of Tuberculosis in Man and Animals; and Dr. E. Ward, Experiences with Diaplyte Vaccines. 11th: Dr. R. C. Matson, of the National Tuberculosis Association of America, will speak on Tuberculosis Work in America, Dr. Stanley Griffith on Lupus, and Mr. G. R. Girdlestone on the Present Day Treatment of Bone and Joint Tuberculosis. On the 12th a visit will be paid to the Papworth Colony by invitation of Dr. P. C. Varrier-Jones, the medical director. Particulars regarding travelling arrangements and accommodation may be had from Dr. F. J. C. Blackmore, hon. secretary, 38, Herbert-road, Plumstead, S.E. 18.

# Reviews and Notices of Books.

PSYCHIATRY.

*Occupation versus Restraint.* By L. VERNON BRIGGS, M.D. Boston, Mass.: Wright and Potter. 1923. With 10 illustrations. Pp. 205.

THIS book is a record of its author's efforts to improve the conditions of asylum treatment in Massachusetts. It has to be remembered that the lunacy laws of the States composing the U.S.A. exhibit wide variations, and the reforms in which Dr. Briggs was the leading protagonist were already accomplished and accepted as a matter of fact in the State of New York before his work began. Apparently the laws of Massachusetts admitted of various abuses; in State asylums the attendants were generally of an unsuitable type, and not infrequently brutal in their treatment of patients; mechanical restraint was commonly practised and insufficiently recorded, and occupation therapy was neglected. Numerous private asylums existed, innocent of any adequate State control, and conducted principally for financial gain; in these various abuses were alleged. Owing almost entirely to the energies of the author, two Bills were passed in the year 1911 by the Senate of Massachusetts, the main effects of which were severely to limit the uses of restraint, to institute the proper selection and instruction of attendants, and to introduce occupational treatment. This record of the years spent in attaining these ends reads almost like a personal diary; much correspondence, some of which appears trivial, is quoted verbatim, and a good deal of space is devoted to an aspect of the work which must remain a source of regret to everyone concerned—namely, the personal antagonisms among interested members of the medical profession in Boston which were occasioned by it. The history of this legislation, typical as it is of the advances which mental treatment has made, and is making, throughout the civilised world, is of the first interest, and Dr. Briggs's exposition of it leaves nothing to be desired in clarity, detail, and enthusiasm, but it seems unfortunate that after the lapse of over ten years the differences with his colleagues which these efforts entailed should still receive public advertisement and emphasis.

Record of events subsequent to 1911 is, unfortunately, scanty; more space may perhaps be devoted in a future edition to the effects of the changes made in that year and to the position at the present day. It is always difficult to visualise the conditions of treatment of the insane in the United States, since geographical variations both in the law and in its application still appear to be considerable.

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*Addresses to Mental Nurses.* A Series of 15 Lectures delivered to the Nursing Staff of The Retreat, York, by Various Authorities. Edited and arranged by BEDFORD PIERCE, M.D., F.R.C.P. London: Baillière, Tindall and Cox. 1924. Pp. 288. 7*s.* 6*d.*

DURING the past 22 years it has been customary at the York Retreat each year to invite a distinguished alienist to deliver an address to the nursing staff. Dr. Bedford Pierce, until recently medical superintendent of The Retreat, has published 15 of these addresses in book form, each being preceded by a short account of its author, a feature which adds greatly to the interest of the volume. Although broadly concerned with the practice of nursing, the subjects chosen vary considerably; several are really lay sermons on the higher duties of nurses to the insane, and on the motives and character which must underlie their work. In some cases the subjects are more technical—for example, the late Dr. James Middlemass on night nursing, and Dr. Henry Devine on occupation therapy. A few deal with what may be called the philosophy of mental alienation, and not a few vital questions of ethics receive considerat on. One of these is summed up in a quotation from the late Dr.

Charles Mercier: "I can conceive of circumstances in which it might be right to deceive a sane person, but I can think of none which justify the deception of an insane person." Perhaps the wittiest in a company not by any means devoid of humour is the late Sir George Savage, in an address on the Private Nursing of Mental Patients; many of his anecdotes are worthy of an accessible pigeon-hole in the reader's memory.

The publication of these addresses may be welcomed not merely on the score of their scientific and literary merit, but because the book fulfils two purposes which are served by no other. As a medium for conveying some idea of asylum work, its difficulties, and the spirit in which they are faced, it is capable of improving public understanding of this work, a function of which no other book in existence is capable; if it should have the effect of inducing educated women to enter the mental nursing service it will have served another valuable purpose. For mental nurses themselves it provides a stimulus and an interest which are perforce lacking in their text-books, and it is very much to be hoped that mental hospitals throughout the country will see that copies are available for such of their staff as are unable to buy it. Just as the education of a medical student may be considered incomplete until he has read such classics as "Confessio Medici," and Lauder Brunton's lectures on the Action of Medicines, so should this book in future years be regarded as essential to the higher education of the mental nurse.

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### RADIOGRAPHY AND RADIOTHERAPEUTICS.

Vol. I., Radiography. Fourth edition. By ROBERT KNOX, M.D., C.M. Edin., Hon. Radiographer, King's College Hospital, London. London: A. and C. Black. 1923. Pp. 448. 40*s*.

Dr. Knox's work has come to be recognised as one of the best books on radiology published in this country, and has established the author's reputation abroad. This first volume of the fourth edition is occupied entirely with radio-diagnosis, and in the first part dealing with electrical supplies, apparatus, and the equipment of X ray departments there is little notable change from earlier editions. The publisher's note tells us that advantage has been taken of the opportunity to revise carefully the text and to add the results of considerable advance in the technique for the examination of the liver, gall-bladder, and urinary tract; but in view of the more elaborate volumes dealing with the chest and the gastro-intestinal tract which the author has in preparation, it was decided to leave these last-named sections practically unchanged.

This paragraph shows at once the strength and weakness of this edition. The strength is manifested in the excellent sections on X ray examinations for diseases of the gall-bladder and kidney which give all that is good and latest in the investigation of these conditions and pyelography. The anatomical considerations are clear and well put, and particular attention must be drawn to the very practical and illuminating Appendix I.—viz., "Observations on Cases Illustrating the Differential Diagnosis in Renal and Gall-bladder Work." It seems unfortunate, however, that for whatever reason the sections on the thorax and gastro-intestinal tract should not have been brought so fully up to date. Cardiospasm, a phenomenon of increasing interest, still receives scant notice, while, although Carelli's method of perirenal inflation is dealt with at some length, the reader looks in vain for material on which to form an opinion regarding the value of artificial pneumoperitoneum as an aid to X ray diagnosis. In the section on thorax no great stress is laid on the use of stereoscopy in the examination of chest conditions, especially in the question of the diagnosis of early tuberculosis, where it may be of the greatest value. Nor are there any references to the examination of chests after the production of artificial pneumothorax, a proceeding of very definite diagnostic value, bringing the radiologist into touch with the general physician.

The chapters on injuries to bones and joints have been rearranged and enriched by many additional illustrations. In fact, in spite of the loss of definition which is inevitable in the reproduction of X ray negatives, the prints are clear and form a notable feature of every part of the book. Besides the appendix mentioned above, there are notices of the Protection of X-ray and Radium Workers, and a brief description of the working of a Lilienfeld tube, while the Potter-Bucky diaphragm is still kept in the appendix section and no references are made to attempted modifications. The subject of radiography in midwifery is not discussed, and is perhaps the biggest complete omission. But the author has had to use much judgment in what things deliberately to leave out. At the present time there is no better work than Dr. Knox's on its subjects.

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### OPHTHALMOLOGY.

*Lehrbuch der Augenheilkunde.* By Dr. PAUL RÖMER, Director of the University Eye Clinic at Bonn. Fourth revised edition. With 306 illustrations in the text and 32 coloured plates. Berlin and Vienna: Urban and Schwarzenberg. 1923. Pp. 500. 15 Standard Marks.

THE third edition of this text-book was reviewed in these columns some four years ago and the revision to which the present edition has been subjected has not materially altered it. The illustrations, and especially the coloured ones, are remarkably good, a fact which makes the work valuable to the non-German student. The style is concise and there is no superfluous matter. Indeed, in a work on this scale the student could wish for a fuller treatment of some important subjects such as glaucoma. The book does not profess to be a guide to ophthalmic operations.

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### THE INSULIN TREATMENT OF DIABETES MELLITUS.

By P. J. CAMMIDGE, M.D. Lond., D.P.H. Camb. Edinburgh: E. and S. Livingstone. 1924. Pp. 172. 6*s*.

THE book opens with an account of the previous attempts which have been made to find the internal secretion of the pancreas, and goes on to give a short description of the circumstances which led Banting to discover insulin. An account is then given of the early clinical results obtained by the Toronto workers. The exact meaning of the term diabetes mellitus and the different conditions which are included under this name are considered, and Dr. Cammidge sets out briefly the different types which he has distinguished. [This work has been dealt with at length in the author's book entitled "New Views on Diabetes Mellitus," which was recently reviewed in these columns.] The indications for the use of insulin are then described, and an account is given of Kellog's table for drawing up a diet for a patient. The ideals of treatment, no sugar in the urine and a normal blood-sugar, are then discussed.

The actual method which the author uses is a most formidable one, as it entails the carrying out of a very large number of investigations in order to place the type of the disease, and this can only be done in the laboratory. The patient is given a standard diet which contains a large amount of carbohydrate, often 80 g., so as to determine the severity of the disease. A test breakfast is given, and the blood-sugar investigated at short intervals after it. On these findings it is decided whether the type is suitable for treatment with insulin. So far about 50 per cent. of the patients examined have not been deemed suitable, as the glycosuria could be controlled by dietetic restrictions. Details of these cases are given, and also of many others in which insulin was used with much benefit to the patient. The amounts of carbohydrate which Dr. Cammidge aims at giving are much larger than

are used by other workers, 95 g. in one case being used with 40 units of insulin. Renal glycosuria and its dangers with regard to insulin are touched on, and an account is given of the symptoms of hypoglycæmia. One patient, who was eating 90 g. of carbohydrate, having had 40 units of insulin, was taken ill because he omitted to eat the usual amount of carbohydrate after his morning dose of insulin. He quickly recovered from the state of hypoglycæmia when sugar was given. The treatment of coma is discussed and also the ill-effects of infections. The point is made several times that insulin is not a cure, and that the statements in the lay press have had an unfortunate effect on many patients who think that they can have insulin and eat what they like.

The book is not very easy to read, and the account of the treatment with insulin is somewhat overloaded with details of the diagnosis of the condition, but it contains much interesting matter, is well printed, has a good index, and is moderate in price. It conveys valuable and practical lessons.

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THE CHEMICAL BASIS OF GROWTH AND SENESCENCE. By T. BRAILSFORD ROBERTSON, Ph.D., D.Sc., Professor of Physiology and Bio-chemistry, University of Adelaide, South Australia. London: J. B. Lippincott Co. 1923. Pp. 389. 12*s.* 6*d.*

THE appearance of a monograph on the chemical basis of growth will be welcomed by all students of experimental biology whose lot it is to study that "transient force which, by an impulse, seizes flesh and grows to man."

In an introductory chapter the author stresses the similarity between the growth curves of animals and plants, and the curves of autocatalysed monomolecular reactions. It is realised, however, that the process of protoplasmic synthesis is actually an exceedingly complex one, involving multitudinous parallel, successive and independent reactions. To show that a simple formula, such as that which characterises the progress of a monomolecular autocatalysed reaction can be applied to a complexity of events, it is necessary to invoke the idea of a "master reaction." The slowest reaction in a series of chemical reactions is looked upon as governing the time relations of the whole, much in the same way as in a factory the slowest of the diverse operations determines the daily output of the finished product. In the higher metazoa, at any rate, it is suggested that the forward reaction, governing protoplasmic synthesis, is actually polymolecular, though the reverse reaction of protoplasmic breakdown is probably monomolecular. In succeeding chapters the growth curves of man, animals, plants, and unicellular organisms are considered in relation to the foregoing theory. "Allelocatalysis" is dealt with at some length, more especially in relation to the development of Enchelys. It is of interest to note that more recent work has failed to confirm the necessity for the animal to develop a definite concentration of "X substance" before division can take place. Although growth-promoting substances undoubtedly exist it is doubtful whether their action is as simple as the author suggests.

The substrates of growth—that is to say, the raw materials of protoplasmic synthesis, inorganic salts, amino-acids, and accessory food factors—are next considered; after which senescence and the retarding influences of growth receive attention. The conclusion is reached that senescence is the necessary outcome of differentiation. This is followed by a brief but highly speculative consideration of cancer, and an equally speculative chapter dealing with the relation of lecithin, cholesterol, and "tethelin" to growth.

As an example of the author's conception of growth, the law which regulates the growth of the cells of a higher animal under ordinary conditions, may be given in his own words. "The accumulated autocatalyst of nuclear synthesis, stored up in the nuclei and prevented from escaping at the moment of nuclear division by the abundance already present in the nutrient medium, finally accelerates the reverse reaction of nuclear synthesis to so great an extent that the velocity of the reverse reaction becomes equal to that of the forward reaction, before the critical nuclear ratio which is requisite for cell division is attained. Further cell multiplication is thus inhibited and stasis is imposed."

The origin of cancer, as the result of repeated repair of injured tissue, is interpreted as "a process of selective breeding whereby the cells of the lowest nuclear ratios" (Hertwig's Kern-Plasma relation) "are favoured and enabled to propagate. Should the inherited variability of the cells in the locality enable at length the appearance of a type of cell so physiologically differentiated from its competitors as to be able to multiply freely at the prevailing nutrient level and in the presence of the prevailing accumulations of autocatalyst, then an outburst of reproductive activity must inevitably ensue and the successful type of cell will inaugurate, if it is sufficiently differentiated, a malignant tumour." This sounds more impressive than illuminating. A bibliography of some of the more important literature on the subject of growth is appended.

The treatment of the subject varies from applied mathematics to reckless speculation, but the book on the whole is of considerable interest as an individual attempt to interpret the various aspects of the growth problem.

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TOXICOLOGIE.

Fourth edition. By FONZES-DIACON, Docteur ès Sciences, Agrégé de Chimie et de Toxicologie, Professeur de Chimie Minérale à la Faculté de Pharmacie de Montpellier, &c. Paris: A. Maloine et Fils. 1924. Pp. 452.

THIS work, now in its fourth edition, is a useful practical handbook on toxicology. Of moderate dimensions, it does not pretend to deal with the subject exhaustively, but there are few substances likely to produce poisonous symptoms which do not receive attention. The writer has evidently had wide experience in the isolation and detection of poisons, and has described admirably the analytical details necessary. His methods are sound and the processes readily followed. The descriptions of the symptomatology, post-mortem findings, and the treatment are the least satisfactory parts of the book. There is a great difference between an account of the symptoms and a graphic picture of a patient suffering from a particular poison, and the descriptions here given are, unfortunately, of the former type. The treatment is mainly limited to the enumeration of correct chemical antidotes, little attention being paid to the all-important, general treatment of the patient. The index is poor, the page number of the principal reference only being given.

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## JOURNALS.

JOURNAL OF ANATOMY. Vol. LVIII. Part DD. January, 1924. Cambridge University Press. Pp. 91. 10*s.*—A number mainly composed of short papers. Dr. H. H. Woollard gives an account of his results in vital staining of the leptomeninges, his experiments being planned to avoid that toxicity which certainly complicated the results of some of Goldmann's experiments.—Prof. J. T. Wilson describes how he applies the Spalteholz clearing method to the study of thick serial sections of embryos. Those who had the opportunity of seeing the striking specimens shown at Cambridge last summer by him will be glad to have an account of their preparation. Prof. Wilson is not yet satisfied with the permanency of his staining.—Mrs. Katharine M. Watson has an interesting and important paper on the development of heart and blood-vessels of the cat.—Prof. F. H. Edgeworth gives a useful account of the masticatory, intermandibular, and hyoid muscles of *Orycteropus capensis*.—An excessively rare variety of abnormal atlas is described by Dr. R. H. Hunter. In this the

original body (odontoid process) remains attached to the atlas.—Prof. Gordon Harrower gives some short remarks on embalming in the tropics.—An account of rudimentary otocephaly in a human fœtus is given by Prof. J. A. Pires de Lima. This variety of monstrosity is not very rare among lambs and kids.—Prof. N. Kulchitsky follows with an important paper embodying his observations on nerve-endings in muscles; he has worked particularly on the muscles of Python, in which he shows the existence of two types of motor-nerve terminations, and deals with many details of structure.—Dr. R. J. Gladstone has a suggestive note on the post-natal growth of the kidney, thyroid gland, and liver, considering these from the point of view of enlargement of the unit structure (hypertrophy) or increase in number of such structures (hyperplasia).—The last contribution is a short account, by Mr. W. W. Wagstaffe, of a rare duodenal anomaly.

BRITISH JOURNAL OF ANÆSTHESIA. January, 1924.—The January number of this quarterly starts with an attractive little historical article on John Snow by Dudley Buxton.—J. T. Gwathmey follows with an account of laboratory and clinical experiments with ethylene and other hydrocarbon gases. From this it appears that ethylene has its uses as an anæsthetic, but not as one which is to be relied on unaided to produce satisfactory anæsthesia. Its analgesic more than its anæsthetic properties appear to have impressed themselves on the investigator. Another article deals with endo-tracheal administration of gas and oxygen with ethanesal and chloroform, a method warmly extolled by Langton Hewer, who gives details of technique and records admirable results. Warm ether vapour, pulmonary after-effects, reciprocity between surgeon and anæsthetist, and other problems form the subject matter of further contributions. The useful current bibliography is continued, and if our contemporary can hold its present form it should become firmly established.

INDIAN JOURNAL OF MEDICAL RESEARCH. January, 1924.—W. G. Liston and M. B. Soparkar write upon bovine tuberculosis in India with special reference to an outbreak amongst the animals in the Bombay Zoological Gardens and the types of tubercle bacilli isolated.—N. L. Banerji has a paper on the influence of hydrogen-ion concentration on the dose of alum employed in the clarification of natural waters.—L. E. Napier describes the reaction of the blood in kala-azar.—R. Knowles and B. M. Das Gupta contribute a note upon a flagellate protozoon found in the saliva.—R. McCarrison continues his series of papers on the pathogenesis of deficiency disease.—A. J. H. Russell, A. Ayyar, and Urhaya make some epidemiological observations on an epidemic of relapsing fever in Madras Presidency.—J. A. Sinton provides a valuable contribution to our knowledge of the Indian species of phlebotomus.—U. N. Bramachari, S. C. Chaudhury, J. Das, and P. B. Sen write upon the chemotherapy of antimonial compounds.—P. J. Barraud continues his revision of the culicine mosquitoes of India.—N. H. Fairley and W. G. Liston commence a well-illustrated account of the pathology of dracontiasis.—W. S. Patton writes upon the occurrence of *Hypoderma lineatum* in the Punjab.—H. E. Shortt and C. S. Swaminath have succeeded in infecting a mouse by means of bed-bugs fed on the peripheral blood of a case of kala-azar.

GLASGOW EYE INFIRMARY.—Dr. John Edwards presided at the hundredth annual meeting, recently held, of the Glasgow Eye Infirmary. In the course of his speech he traced the history of the infirmary from its inception in 1824 up to the present day, when it occupies a commodious building in the west end of Glasgow. Dr. W. Gillies intimated that there was a credit balance of £18,948 for the present year, as a result of a donation of £20,000 from Mr. John Ross's trust. Indoor patients had each cost on the average £6, while the expenditure on outdoor patients had averaged 1*s.* per patient. The centenary celebration will take place in June next.

# The Conduct of Medical Practice.

*A Series of Articles by Experts dealing with the Difficulties Encountered in Professional Life and How to Meet Them.*

## XI.—MEDICAL PARTNERSHIPS.

BY JAMES NEAL, M.R.C.S. ENG.,
GENERAL SECRETARY OF THE MEDICAL DEFENCE UNION.

More than most men the family physician feels the tragedy of isolation.—*William Osler.*

IN these days of specialisation it is no longer easy for an individual medical practitioner to cope single-handed with the various aspects of disease met with in what is still called general practice. Twenty or thirty years ago medical practitioners were more generally content to practise independently.

### *Advantages and Drawbacks.*

It is now realised that many advantages can be gained by coöperation, and it is not at all unusual to find multiple partnerships in which the different members of the firm specialise in various departments of medical work to the benefit of all concerned. A firm of medical partners which includes an operating surgeon, an obstetrician, an X ray operator, an oculist, and possibly an ear and throat specialist, is able to cope with almost any conceivable variety of ailment which may be met with in practice, without any necessity for calling in outside help, and therefore occupies a very strong position as compared with an isolated individual practitioner who must necessarily refer his patients to an independent specialist in many circumstances. Moreover, since the introduction of the Insurance Act, it has become more difficult for a young medical practitioner to acquire a practice by the simple process of putting up his plate. It is therefore not surprising to find that medical partnerships are becoming more numerous.

The advantages are obvious. Responsibility can be shared; the capital value of the practice can be maintained better; outside competition can be more easily met; holidays can be arranged without loss; and team-work can be carried on with all its benefits. It has to be admitted that a man who enters a medical partnership must be prepared to sacrifice a certain amount of independence; but the advantages to be gained are so great that there is no doubt the arrangement would become far more general, except for the unfortunate differences that not infrequently arise.

Experience in adjudicating in partnership disputes has convinced me that many of the difficulties peculiar to medical partnerships can be obviated. No medical partnership can be carried on satisfactorily unless there is mutual goodwill between the partners. Consequently, anything likely to become a cause of disagreement must be avoided studiously from the outset. Jealousy is perhaps the rock on which a medical partnership is most likely to be wrecked, and should be carefully guarded against. Mutual trust and loyalty are essential, and each partner should realise that he must play the game in the public-school spirit.

### *Nature of the Contract.*

If a partnership is entered upon for a short fixed period, at the expiration of which both partners may continue practising in the place, not only is the saleable value of either partner's share negligible, but there is a distinct inducement to each partner to compete with the other for a hold on the patients. It is therefore preferable that the duration of a medical partnership should be for the joint lives of the partners, with provision for either partner to dispose of his share after giving the requisite notice; except in those cases where a brief partnership is arranged deliberately with a view to the acquisition by the junior partner, after a specified period, of the whole practice.

In all partnerships with a view to succession, it is desirable that the date of the retirement of the senior partner should be definitely stated in the agreement, and also the terms upon which his share in the partnership shall be acquired by his successor. An ordinary partnership should be terminable by either partner giving due notice at any time after the first few years; so that if either partner finds the partnership unsatisfactory it is possible for him to dispose of his share and thus withdraw from the partnership. It should, however, be an essential proviso that the retiring partner may not continue to practise in the district.

A medical practitioner who enters into partnership with one or more other medical practitioners necessarily finds himself bound by the ordinary obligations imposed upon any persons "carrying on a business in common with a view to profit." But a partnership between two or more medical practitioners differs in some respects from a partnership between persons engaged in any other profession or trade. Medical partners hold little joint stock; their principal partnership asset is the goodwill of the practice. Consequently, the profits of the partnership are not derived from the share which each partner has in the partnership assets, but from the professional work of each partner.

From the strictly legal point of view a partnership may be created by a verbal contract, or may even be inferred either from the fact that the profits of a joint business are shared, or that the parties allow their names to appear in such a way as to imply that they are carrying on the practice as partners. In all medical partnerships it is essential that a formal agreement of partnership should be entered into and signed before any act of partnership is performed. Too often as soon as a medical partnership is decided upon, the work of the partnership is allowed to commence before many necessary details are settled. I have known months, and, in some cases, several years, elapse before the actual legal agreement was even drafted. If any disagreement should then arise, the position may easily become extremely complicated, and disaster may result.

### *Drawing Up the Agreement.*

The agreement of partnership is a most important document. It should invariably be prepared by a solicitor who is experienced in the peculiar difficulties which are likely to arise in connexion with medical partnerships, and who is therefore able in a great measure to guard against them. The slightest ambiguity in the wording of a clause in the partnership agreement frequently leads to serious differences between the partners, and may even make the continuance of the partnership impossible.

All partnership agreements should define:—

1. The duration of the partnership.
2. The terms on which the share of the incoming partner is to be acquired, and the terms on which his share may be increased from time to time.
3. The mutual rights and duties of the partners.
4. The property of the partnership.
5. The expenses to be met by the partnership.
6. The fees to be charged.
7. The terms of dissolution in varying contingencies, including the restrictions to be imposed on a retiring or outgoing partner.
8. The procedure to be adopted in the event of any disputes between the partners.

Other matters properly to be included are provision for the keeping and auditing of the accounts, for periodic division of profits, for holidays, and for dealing with prolonged absence or incapacity of either partner. Whenever a medical practitioner contemplates entering into a partnership, a careful investigation of the books of the practice should be made by a competent accountant, experienced in medical book-keeping. This is as essential as when a practice is to be bought outright, but is a precaution too frequently dispensed with. It is also well to make sure that a prospective partner is a duly registered medical practitioner. There are several cases on record where an unqualified person has successfully represented himself to be registered, and has been taken into partnership without any suspicion being aroused or inquiries made.

A partnership agreement may always be varied by the consent of all the partners. Many difficulties and disputes would be avoided if any departure from the strict letter of the partnership agreement made with the consent of all the partners were recorded in writing, as frequently such consent may be inferred from the circumstances of the case. It has been held in some instances that the constant usage of partners is sufficient to supersede the articles of partnership. This must not, however, be taken to mean that an occasional failure to comply with the strict letter of the agreement invalidates the written provisions.

### *Reciprocal Responsibility.*

Every partner is entitled to take his share in the management of the business of the partnership, and is under an obligation to devote himself diligently to the work of the practice. Special importance attaches in the case of a medical partnership to the following clause in the Partnership Act, 1890:—

> § 10. Where, by any wrongful act or omission of any partner acting in the ordinary course of the business of the firm, or with the authority of his co-partners, loss or injury is caused to any person not being a partner in the firm, or any penalty is incurred, the firm is liable therefor to the same extent as the partner so acting, or omitting to act.

This means that each partner in a medical firm will be responsible for any other partner's negligence or malpraxis. It is consequently usual to include in a partnership agreement a clause whereby each partner is required to make good any loss occasioned to the firm by negligence or misconduct on his part. The most desirable arrangement is to stipulate that all the partners should be and remain during the continuance of the partnership members of one of the medical defence societies, and preferably that all should belong to the same society.

It is usual for each partner to provide his own surgical instruments, and also to provide his own means of locomotion. But special arrangements must be made in exceptional circumstances.

### *Division of Labour.*

The division of the work among medical partners is a matter of arrangement, but the general principles should be decided beforehand, and embodied in the agreement. When a younger man is taken into partnership by an established practitioner who wishes to be relieved of some of his work, it is only right that the senior partner should decide largely which cases should be seen by the junior. This does not mean that the junior should be treated as an assistant, and many promising partnerships have been ruined by unfair treatment in this respect. The junior must reasonably expect to be given the less important work for a time, but his rights as a partner must not be infringed. For instance, it would be unreasonable for the senior partner to expect his junior partner to take all night calls and midwifery, unless it was a special arrangement agreed to before the partnership was entered into, in which case it should be embodied in the Articles.

The position is different when the partnership has been arranged with a view to the succession of the junior within a comparatively short period. His effective introduction is essential to the proper transfer of the goodwill, and must not be unduly delayed. A judicious arrangement of the work with due regard to the susceptibilities of the patients should be possible, and must be insisted upon. When there are more than two partners, any difference arising as to ordinary matters connected with the partnership business may be decided by a majority of the partners.

### *Assistance with a View to Partnership.*

No one should consent to act as an assistant with a view to partnership on a mere verbal assurance that he will eventually be admitted into partnership. Too

often it is found that the intentions of the principal change, and that after repeated delays some more or less imaginary reason is advanced for not carrying out the original intention. When a preliminary service as an assistant with a view to partnership is suggested, it is well to insist that a definite agreement for partnership to commence on a future date specified in the agreement shall be entered into and signed by both parties. To guard against incompatibility, liberty should be given to either party to cancel the agreement within a specified period, not exceeding six months, in which case the proposed partnership would be nullified.

### CERTIFICATION IN INSURANCE PRACTICE.

Dr. J. Hedley Marsh, of Macclesfield, comments as follows on the article by Mr. L. Shoeten Sack which appeared in THE LANCET of March 1st, p. 450:—

"Mr. Shoeten Sack states that where a doctor neglects to grant an intermediate certificate within 24 hours of seeing the patient he should not use the new voluntary certificate, but should use the 'regular form of certificate.' If by regular form of certificate he means form Med. 40 revised, he is, I believe, in error. The doctor should give one of his own private certificates or write on a plain piece of paper. Rule 8 is quite explicit, and the Commissioners' ruling in a recent case here in Cheshire forbids the use of the official form Med. 40, except as expressly laid down. The whole question of certification is a nightmare to the conscientious practitioner. It now requires a barrister-at-law to interpret its verbiage, and even with his help a wrong construction may be placed on the official jargon."

Mr. Shoeten Sack replies: "Rule 8, considered by itself, might suggest this interpretation. Rule 2, however, limits the use of the prescribed forms of certificate by providing that these forms 'shall not be used on any occasion on which the practitioner is not required by these Rules to give a certificate.' This clearly prohibits their use where the insured person is himself responsible for a delay in the issue, for in such a case the doctor is not 'required' to give a certificate but may use the voluntary or a private certificate as an act of grace. Article 2 does not, however, seem to exclude the issue of a regular certificate where the patient has made due request, and the doctor has neglected to give the certificate within 24 hours; for then, in spite of his dilatoriness, the doctor is still 'required to give a certificate.' Rule 8 merely defines the doctor's obligation as to the time when the certificate is to be issued. If, after due request, the doctor neglects to issue the certificate within 24 hours of the examination, he admittedly commits a breach of this rule, but the insured person still remains entitled to receive the regular certificate for which he asked at the proper time. If it were otherwise, what would become of the requirements in Rules 3, 4, and 5 that the doctor *shall*, if desired by the insured person, issue a first or intermediate certificate? The breach by the doctor of Rule 8 cannot be held to render the other rules of no effect.

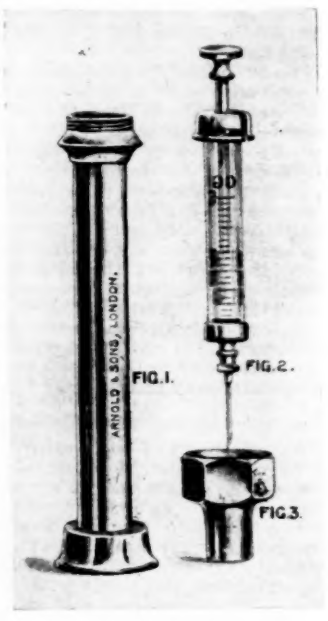
"In the memorandum, Form G.P. 37, which was sent to insurance doctors when notice was given of the altered terms of service under the Medical Benefit Regulations, 1924, the Minister of Health thus explains the point (para. 10(*c*)): 'It should be specially noted that they [the voluntary certificates] cannot properly be used in cases in which the practitioner was himself at fault in not issuing within the required time a certificate which it was his duty to issue. In cases where the patient was not at fault but the doctor has omitted to give or send a certificate within the time specified in Rule 8, an ordinary official certificate should be issued, showing the date of examination and the date of signing.' The 'ordinary official certificate' in this passage means any of the prescribed forms of certificate other than the voluntary certificate, and therefore, of course, includes Form Med. 40 revised.

"The Cheshire case which Dr. Marsh quotes was presumably either a case which arose before the introduction of the voluntary certificate, or it referred to the issue of Form Med. 40 where the insured person himself was at fault through having neglected to ask for a certificate at the proper time."

# New Inventions.

### A NEW INSULIN SYRINGE.

THE repeated injection of insulin frequently causes inflammatory reaction and a hardening of the tissues. With the ordinary Record syringe and needle this causes a marked resistance to the injection of the fluid, and in many cases there is a loss of from 3 to 4 minims of insulin past the plunger of the syringe. When to this is added the necessity of continued sterilisation, repeated daily injections may become very irksome. I have had devised a syringe and holder to overcome these difficulties.




The syringe is a 2 c.cm. Record armed with a No. 19 or 17 needle. The plunger is grooved to hold two well-fitting spring piston rings, the gaps in which are so adjusted as not to be in line. This syringe (Fig. 2) will hold a very high degree of compression, and will not leak past the plunger. The container of the syringe is a metal cylinder with an alcohol-tight screw cap. The syringe is kept in absolute alcohol within the container and is always sterile. The fitting of the cap is so arranged that it is not necessary to have any leather or rubber washers, and yet is perfectly spirit-tight. The metal container (Fig. 1) has a wide, flat, heavy base and will stand upright. The screw cap (Fig. 3) has also a flat top, carries a spring which holds the syringe immobile in the container, and is sufficiently deep to hold a drachm of alcohol. The syringe is admirably adapted for the injection of any fluid against great resistance. The idea has been applied to a series of syringes of varying sizes for different uses. In my hands their use has been uniformly pleasing.

The syringes are made by Messrs. Arnold and Sons (John Bell and Croyden, Ltd.), 50–52, Wigmore-street, London, W. 1.

Welbeck-street, W. TILSON DINNICK.

GROCERS' COMPANY'S RESEARCH SCHOLARSHIPS.—With the object of encouraging original research in sanitary science, the Grocers' Company offer three scholarships each of £300 a year, with an allowance to meet the cost of apparatus and other expenses in connexion with the work. The scholarships are tenable for one year, but renewable for a second or third year, subject to the conditions of the scheme under which they are established. The next election will take place in May, 1924, one scholarship being now vacant. Applications must be sent in before April 1st to the clerk of the Grocers' Company, Grocers' Hall, London, E.C. 2, from whom a form of application and further information may be obtained.

# THE LANCET.

*LONDON: SATURDAY, MARCH 15, 1924.*


## THE SYSTEMIC EFFECTS OF RADIATION.

FOR a long time after the destructive effects of X rays and radium on various kinds of pathological cells had been ascertained, attention was concentrated upon this action rather than upon the physiological effects of radiation on the tissues in general, and it is only within the last three or four years that the dangers attending the use of gamma rays are being fully revealed. Superficial damage to the skin caused by the softer types of X rays, and resulting in dermatitis or something worse, was the first to attract general notice; more recently the damage done to the deeper structures including the blood-forming organs by the more penetrating types of X rays and the gamma rays of radio-active substances has been observed. Taking the skin as a type of tissue moderately vulnerable to radiation, we can now classify tissues roughly into those of greater and lesser vulnerability—on the resistant side, muscle and nerve tissue; on the susceptible side, blood-cells and germinal tissue; and to the latter must now be added the cells lining the alimentary canal. In a recent article [1] allusion was made to some valuable American studies on X ray intoxication with special bearing on radiation of the abdomen. Experiments on dogs showed that a dose of X rays which, directed over the thorax, gave no clinical evidence of intoxication, ensured the death of the animal on the fourth day if given over the abdomen. Going further, it was found that in dogs the secretory crypt of epithelium of the small intestine was the first to undergo autolysis. These experiments gave no support to the belief that X ray nephritis might be produced by hard Rontgen rays, since the epithelium of the kidney was found to be much more resistant than the epithelium of the small intestine.

We publish this week a study of the metabolic changes associated with X ray and radium treatment undertaken by Dr. E. C. DODDS and Dr. J. H. DOUGLAS WEBSTER, who recount the results of a piece of laborious work which was completed in August of last year. The machinery of two scientific departments at the Middlesex Hospital was set going to determine the essential biochemical changes involved in radiation toxæmia, or X ray sickness as it has graphically been called. The aim of the research was to determine, by a study of basal metabolism, what are the characteristic changes in radiation toxæmia, in order to bring these changes into relation with other comparatively well-known toxæmias such as those occurring during anæsthesia, in the course of diabetes, as a result of fevers, migraine, uræmia, and the like. A primary difficulty in this investigation, which was carried out entirely upon the human subject, was to appraise correctly the three factors necessarily complicating the results—namely, the disease in question, the effect of treatment on the disease, and finally the effect of the rays on the patient's metabolism. Four clinical groups of disease were investigated, the patients being in bed and maintained on constant diet, while the urine collected in 24-hour specimens was completely analysed for urea, uric acid, ammonia, acidity, total nitrogen, ammonia coefficient, phosphates, chlorides, creatinin, and diastase. The results of all these clinical findings coincided in a remarkable degree with those obtained experimentally in animals by the American observers. The changes in metabolism, closely similar whether X or gamma rays were employed, were found to vary essentially with the site radiated. Radiation of head, thorax, or limbs produced no appreciable change in metabolism. Radiation of the cervical region produced no change other than an immediate fall in the urinary creatinin, attributed by the authors to temporary paralysis of the parathyroids. On the other hand, radiation of the abdomen and spleen produced definite urinary and blood changes which are set out in tabular form in the authors' article. The metabolic changes can be best explained by a temporary inhibition of the functions of the three principal abdominal glands—namely, the liver, pancreas, and kidneys—the fall in urea content of the blood being outside the picture. The figures give no support to the theory of acute uræmia recently enunciated by ANDERSEN and KOHLMANN, which was the starting-point of the authors' investigation; but they do give some support to LANGE'S theory of acidosis, in view of the fact that the ammonia coefficient definitely rises as a result of radiation.

In the light of the metabolic changes which they observed, Dr. DODDS and Dr. WEBSTER suggest the possibility of prophylactic measures, which are to form the basis of a further investigation. Administration of calcium chloride or sodium bicarbonate before radiation has already in some cases resulted in a diminution of the ensuing reaction. The whole plan of work should be studied very carefully by all who are occupied with the application of X rays or radium to any part of the body, for the authors discuss in an objective and dispassionate manner all the theories hitherto advanced to explain the incidence of radiation toxæmia, and their scholarly contribution should materially clear the way for later workers. The discussion on the clinical results of deep X ray therapy, announced for March 21st at the Royal Society of Medicine, will benefit by starting from some such sound pathological basis.

[1] THE LANCET, Feb. 16th, p. 344.

## PROPOSED ALTERATIONS IN THE LAW OF THE FAMILY.

PARLIAMENT has before it at the present moment an unusual number of measures affecting the law of the family. Of these Lord BUCKMASTER'S Legitimacy Bill has perhaps the most hopeful prospects, for both the Prime Minister and the Lord Chancellor have stated that it has the approval of the Government. If the principle of *legitimatio per subsequens matrimonium* is now adopted in England, it will repeal one of the oldest Acts on our statute-book; but very few other countries have agreed with us on the point, and we ourselves would probably have changed our law last year but for the dissolution of Parliament. Lord BUCKMASTER proposes that "legitimated persons" shall be able to inherit property on intestacies, and that in future wills the words "child" or "issue" shall include legitimated children unless the contrary intention is expressed. Lord PHILLIMORE would reject the clause which says that the Bill shall not affect the succession to dignities or titles. It certainly seems odd that one person should inherit the ducal estates while another person becomes the duke. In Committee, however, Lord GORELL'S amendment to omit the clause was defeated. The Archbishop of CANTERBURY succeeded in narrowing the Bill to

cases where both parents were unmarried when the child was born. A similar stipulation appears in Mr. WIGNALL'S Illegitimacy Bill, which proposes to consolidate and amend the Bastardy Acts and kindred legislation. This Bill must expect sharp opposition, for in affiliation proceedings it would abolish the need of corroboration of the story of a woman who is the mother of, or believes herself to be pregnant with, an illegitimate child. Some of its provisions might open the door to blackmail.

The Matrimonial Causes Bill is another House of Lords Bill sponsored by Lord BUCKMASTER. It claims to be based on the majority report of the Royal Commission of 1909 presided over by Lord GORELL. In one respect it is not so drastic. The majority report (published in 1912) would have allowed judges to close the court in divorce cases and to order specific parts of the evidence or speeches not to be published; it recommended that no report of a divorce case be published till the case was finished, that all photographing or sketching of parties or witnesses should be forbidden, and that breaches of these provisions be treated as contempt of court. Lord BUCKMASTER merely provides for closing the court at discretion. In more vital matters he accepts the Royal Commission's views completely. The sexes are to be on an equality in divorce proceedings. There are six grounds for divorce: (*a*) adultery; (*b*) desertion for three years; (*c*) cruelty; (*d*) incurable insanity (after five years' confinement); (*e*) habitual drunkenness found incurable after three years from the first separation order; and (*f*) imprisonment under commuted death sentence, to which he adds also confinement in a criminal lunatic asylum. The grounds for pronouncing nullity of marriage are four: (*a*) non-consummation; (*b*) marriage by person of incipient mental unsoundness becoming definite within six months, or by a person who is epileptic or insane; (*c*) venereal disease existing at date of marriage; and (*d*) pregnancy of the wife at date of marriage by some man other than the husband. Under (*b*), (*c*), and (*d*) the applicant must have been ignorant of the facts at the date of marriage, must not have had marital intercourse since discovery of the truth, and must have instituted proceedings within a year of the marriage. Separation orders obtainable from magistrates are limited to two years, after which an extension may be obtained from the High Court; these temporary orders may be granted for cruelty, habitual drunkenness, or venereal disease. Separation and maintenance orders in their summary jurisdiction aspect are also the subject of a Bill brought forward by Sir ROBERT NEWMAN. The latter allows a married woman to apply for an order on the ground of her husband's cruelty and neglect, notwithstanding that such treatment has not caused her to leave him. There is another clause assisting a wife who is driven to prostitution by a husband whose conduct is likely to result and has in fact resulted in her degradation. Adultery by the wife at present discharges an order. Sir ROBERT NEWMAN proposes that this discharge shall not be automatic if the court considers that the husband's failure to make his payments has conduced to the adultery; and, where the magistrates do discharge the order, they may make a fresh order giving the wife the custody of the children and directing the husband to contribute weekly to their maintenance. With Parliamentary time limited by financial debates and by special difficulties of other kinds, it is hard to estimate the chances of changing the law on these points, but it will be recalled that a measure to amend the law of separation and maintenance orders was included in the King's Speech in January.

Mrs. WINTRINGHAM'S Guardianship of Infants Bill is not yet available for perusal. Both Sir M. MACNAGHTEN and Sir THOMAS INSKIP have presented Adoption of Children Bills. The latter's is the shorter and more workmanlike; it provides for the adoption of children under 10 with the approval of the High Court or county court, the court being directed to have regard solely to the interests of the child. The law affecting the family would be strengthened in many respects if the Children Bill were passed which we have previously discussed. In his capacity as private member Mr. AMMON has brought in an Offences against the Person Bill, which goes over again much of the ground covered by the Children Bill, and is perhaps unlikely to make much progress. As both these Bills have important clauses relating to criminal assaults upon young people, it may be hoped that the draftsmanship is satisfactory. The Criminal Law Amendment Act of 1922 had not been many months in force before the Court of Criminal Appeal found that its interpretation involved consequences both favourable and adverse to offenders which Parliament could never have intended. Proposals which are not likely to experience judicial criticism of this kind are contained in the Criminal Justice Bill, which is founded on solid professional and judicial support. The Bill, inter alia, would remove the legal presumption that a wife who commits an offence in the presence of her husband has acted under coercion from him. This presumption is not recognised outside England and is unsuited to an age of sex equality. If it disappears, it will still be possible for the jury to find that in the facts of the particular case the wife was so coerced by her husband. There remains one proposal which will raise less stir than it would have evoked before the passing of the Deceased Wife's Sister Act of 1907 or the Deceased Brother's Widow Act of 1921. Mr. RENDALL'S Marriage (Prohibited Degrees of Relationship) Bill would allow marriage with a deceased wife's brother's or sister's daughter or a father's or mother's deceased brother's widow, or, in plain English, marriage with persons who are nephews or nieces by marriage. Sufficient unto the day when the Bill becomes an Act are the complicated relationships which may ensue from such unions. For some of the prospective measures mentioned above a precedent could be cited from some other part of the Empire. If the Imperial Parliament is beginning to give marked attention to proposals of social reform specially affecting family life, much of the credit must undoubtedly be given to the feminine portion of the electorate, whose numbers it has recently been proposed to enlarge.

## THE ACID-BASE BALANCE OF THE BLOOD.

THE automatic adjustments of the human body have often been an object for envy on the part of laboratory workers who find it difficult from a mass of conflicting influences to achieve a constant result. In whatever direction and for whatever length of time the balance is disturbed, there is an invincible tendency to return to the physiologic norm as soon as the disturbing influence is eliminated. This has long been evident with regard to the regulation of the body heat; it is only of recent years that it has been shown to apply to the chemical reaction of the tissues. The exact range of hydrogen-ion concentration of the blood serum which may be considered normal is still in dispute, although it probably lies

between the variations represented by pH 7·3 and pH 7·5. Under exceptional conditions these limits may be exceeded, but a return to normal is rapid and automatic; the extreme variations compatible with life appear to be on the acid side pH 6·9 and on the alkaline side pH 9·0. Beyond these limits presumably life is impossible. The latter figure has only been seen under experimental conditions, and it is probable that a figure of 7·9 is rarely, if ever, exceeded. Wide variations occur in the course of disease and similar variations have been produced experimentally in man. Some remarkable results obtained on himself and colleagues at Oxford and Cambridge were given by Mr. J. B. S. HALDANE at a recent meeting of the Section of Therapeutics and Pharmacology of the Royal Society of Medicine, and are summarised in our present issue. Mr. HALDANE produced acidosis by the ingestion of large doses of ammonium chloride and alkalæmia by similar doses of sodium bicarbonate. After taking 45 g. of $NaHCO_3$ he found that the alkali reserve of the blood might be increased by 20 per cent., the blood becoming more alkaline and ammonia disappearing from the urine. After taking 65 g. of $NH_4Cl$ spread over a period of three days the alkali reserve was reduced to less than half of the normal, the calcium content of the serum rose by 10 per cent., and the excretion of Na, K, Ca, and P was vastly increased. When he took $NH_4Cl$ the body-weight was found to drop sharply and the hæmoglobin in the blood to rise, owing probably to physical change in the body colloids. Dr. ARTHUR ELLIS, who contributed to the same discussion, narrated the case of a patient suffering from alkalæmia as a result of pyloric obstruction who was given three-hourly 10 oz. of 2 per cent. ammonium chloride per rectum for four doses, or about 22·5 g. in all. Before treatment tetany and general convulsions were occurring, the pH of the plasma being 7·6 and the plasma bicarbonate standing at 120. Twelve hours later tetany had disappeared, muscular irritability was greatly diminished, although still present; convulsions had ceased. The plasma pH was then 7·4, the plasma bicarbonate 76. The interesting question remains to decide how long variations in hydrogen-ion concentration artificially produced are maintained. There can be little doubt that by hot baths the alkaline concentration of plasma may be increased to an extent greater than pH 0·1. This was shown by some experiments made by H. C. BAZETT and J. B. S. HALDANE in 1921.[1] Such a change would, however, merely be temporary and the effect would disappear as soon as the individual ceased the over-breathing caused by the temperature of the hot bath. No evidence has been submitted to suggest that the alteration would benefit the patient. The drinking of saline waters in usual quantity and dilution is hardly likely to effect any alteration in the hydrogen-ion concentration of the plasma, inasmuch as the bodily mechanism for dealing with excess acid and alkali is too efficient to be upset by such a relatively insignificant excess in the daily intake of base. Other physical agencies may, however, do so; radiation, for instance, has been shown to produce a temporary disturbance of the acid-base balance in the body.

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By an Order of Privy Council, dated March 3rd, Mr. Edward F. L. Wood, M.P., and Mr. A. G. Church, M.P., have been appointed members of the Medical Research Council. Mr. Wood is appointed to succeed Viscount Goschen, chairman of the Council, who has resigned owing to his appointment as Governor of Madras, while Mr. Church takes the place of Mr. William Graham, M.P., who has resigned his membership of the Council on becoming Financial Secretary to the Treasury.

[1] Journal of Physiology, 1921, iv., 55.

# Annotations.

"Ne quid nimis."

## REMINISCENCES OF PAUL EHRLICH.

HAD he lived, Ehrlich would have been 70 on March 14th of this year. This anniversary is celebrated in a book[1] in which his private secretary, Frl. Martha Marquardt, pulls the curtain aside and shows us Ehrlich as he was at home and in his laboratory. We see, not the impersonal giant of science, but a most human person, with the oddities and eccentricities which, when we see them in our fellow beings, make us laugh and love them the more. The picture of Ehrlich, in constant warfare with his cuffs, is obviously drawn by one whose sex usually guarantees immunity from the discomforts of the floating wristband. Ehrlich would stack his cuffs on a hook behind the door, but sometimes, when he had occasion to resume them, they would be left in place while he wrote or worked with test-tubes, and ever with ceaseless patience he would shake his prolapsed cuffs back with unconscious gestures. At other times he would hold both arms aloft and shake them, hoping that force of gravity would succeed where more than a hundred instinctive jerks had failed. His right-hand man, Kadereit, was everywhere and did everything, from opening his letters to attending to the numberless duties of a laboratory assistant. When Kadereit spoke of "our having discovered salvarsan," he gave expression to the sense of coöperation which Ehrlich's fellow workers enjoyed. Ehrlich had a reputation for forgetfulness in some directions, but he had a positively uncanny remembrance of where he had placed or misplaced things; he knew all about the contents of his numberless bottles, where to find a reference in a stack of books, and where to unearth odd sums of money he had tucked away. Sometimes there were no such sums to tuck away, for his cigar and book bills were heavy. His favourite books were detective novels, but even a tale of romantic crime did not fix his attention enough to prevent his making, on their pages, marginal notes of chemical formulæ. His sense of music, judged by the ordinary standards, was elementary; he loved the "music" of a barrel organ, and at home after dinner he would get his wife to play simple airs and light waltzes, and the simpler and lighter the music, the more pleased and cheerful he would become. It was at moments such as these that his best ideas came to him. Serious music depressed him, and he would revive from its effects only after a rollicking refrain from "Carmen" or some other favourite. After walking about under the cheerful influence of this music, he would sit down to a game of patience, puffing at the inevitable cigar. He would then proceed to jot down notes of the ideas that had come to him, filling many writing pads. He looked upon this work as the most productive of the day, and it was not till after midnight that he would leave the smoke-laden atmosphere of his working-room, and in his bedroom he would often continue reading and making notes till far into the night. There was only one evening in the week when he did not beg his wife to play to him. This was Sunday evening, when a 30-pfennig copy of the last number of a detective magazine formed an irresistible counter-attraction. About Christmas, 1914, he had a slight stroke, the immediate effects of which passed off in a few days, but he was left a silent and abstracted man. He was deeply distressed over the war, anticipating many of the troubles it would bring to all, and a break in his scientific coöperation with friends abroad. But to the end of his life he sometimes spoke with enthusiasm about future lines of research, and once remarked that even if he did nothing further himself, there were enough ideas jotted down in his note-books to give employment to a dozen chemists for

[1] Paul Ehrlich als Mensch und Arbeiter. By Martha Marquardt. Berlin and Stuttgart: Deutsche Verlags-Anstalt.

years under his direction. A second stroke on August 20th, 1915, suddenly terminated the career of one of the benefactors of mankind.

## VENEREAL DISEASE AMONG MENTAL DEFECTIVES.

THE Mental Hospitals Committee of the London County Council has taken exception to a paragraph in the recently published report of the Government Committee on the Prevention of Venereal Disease which runs as follows:—

"There are found to be a considerable number of persons suffering from venereal disease among mental defectives, and the present arrangements for their control and treatment are inadequate."

The committee recognises that there may be an increased risk of venereal infection among the mentally defective, who lack the power of self-control, which tends in the normal person to sexual continence or at least to the taking of safeguards, and it is the committee's experience that mentally defective girls, if not carefully and wisely controlled, are prone to moral lapses. They, however, point to the reports issued by Sir William Hamer, who has emphasised the fact that there is comparatively little evidence as regards the incidence of primary venereal disease amongst the mentally defective, and that the number of defectives notified under the Mental Deficiency Act—and it is with these alone the L.C.C. is directly concerned—who have been found to have the disease is small and confined to cases notified from refuges, hostels, hospitals, or prisons. The L.C.C. committee is of opinion that the measures contemplated by the Act for dealing with defectives—e.g., supervision or institutional care or guardianship—should give all necessary protection against risk of venereal infection to those who are dealt with. If a defective under supervision or guardianship cannot be kept under such control as will keep him or her free from infection, institutional care ought to render the risk negligible. There may, however, be a difficulty with high-grade cases of mental defect whose social circumstances are such that they cannot be regarded as subjects to be dealt with by the local authority, and who therefore do not come within the purview of the Act. The Mental Hospitals Committee finally state that, as far as their own experience goes, there does not seem to be any special justification for the very wide statements made in the paragraph quoted.

## JAUNDICE IN ENTERIC FEVER.

MM. Garnier and Reilly[1] remark that the idea of a typhoid or paratyphoid origin for the majority of cases of acute jaundice was at one time widely accepted in France, so that in any case of acute jaundice examination of the blood and stools for organisms of the typhoid group as well as Widal's test was always carried out. The discovery of *Spirochæta icterohæmorrhagiæ* threw new light on the pathogenesis of infective jaundice, but the origin of the most frequent variety of acute jaundice—viz., the catarrhal or acute apyretic form—remained obscure. In a study of 1300 cases of acute jaundice the writers found only four which could be attributed to typhoid or paratyphoid infection, so that they have come to the conclusion which agrees with the observations of the old clinicians that jaundice is extremely rare in enteric fever. The symptoms were identical in their four cases. The clinical picture was that of typhoid fever complicated by jaundice, which was always of slight degree and accompanied by the ordinary symptoms of typhoid infection. The discrepancy between the writers' observations and those of previous observers is to be explained by the fact that the laboratory tests employed by the latter were unsatisfactory in a large number of cases. As regards the outbreaks of epidemic jaundice which occurred in the war—e.g., in the Anglo-French armies at Gallipoli in 1915 and later in the French army in Macedonia, the Roumanian army in the Balkans, and the Italian army on the Isonzo—Sarrailhé and Clunet, and Cantacuzène and his collaborators attempted to make paratyphoid bacilli responsible owing to the frequency of bacilli of the paratyphoid group in the blood and stools. The writers, however, point out that the organisms were atypical. Thus, in the Roumanian epidemic the organisms isolated belonged to 14 different strains. Moreover, the extreme degree of contagiousness and the short duration of the incubation period completely differentiated the disease from enteric. The frequency of epidemics of jaundice in the Roumanian troops who had been inoculated against enteric fever and their absence in the uninoculated Turkish soldiers cannot be explained, as Sacquépée suggests, by the paratyphoid infection showing a preference for incompletely immunised subjects, as jaundice was rarely observed during the paratyphoid epidemic in the incompletely immunised French army during 1915 or in the cases of typhoid infection among the inoculated observed by Bernard and Paraf, Labbé, Rist, and others. The writers remark that the view of the paratyphoid origin of epidemic jaundice is by no means so popular in other countries as in France; it has been rejected by C. J. Martin and Sir William Willcox in England, Benczur and Beyreis in Germany, and Kampf and Wornoe in Denmark. The writers conclude that jaundice in enteric may be met with under two different conditions—viz.: (1) exceptionally in patients with typhoid or paratyphoid running an ordinary course, (2) more frequently in individuals who have been subjected to a massive infection either accidentally, as in alimentary intoxication, or experimentally, as was carried out by Cantacuzène.

[1] Paris Médical, 1923, ii., 229.

## THE SANATORIUM AS A RESEARCH CENTRE.

IT would probably be unwise to accept as more than a caricature the picture of a sanatorium superintendent presiding over a cabbage patch, on which patients practise graduated labour, fulfilling his duties as a sort of house physician to the outside tuberculosis officer with the zeal, or want of zeal, that a subordinate station in life evokes. But the administrative blunder which has robbed the sanatorium superintendent of the last word as to the duration of a patient's residence in a sanatorium has inevitably acted as a brake on therapeutic initiative and independent research requiring continuity of observation in certain individual cases. It is therefore a pleasant surprise to find that, in spite of this obstacle, important research is being carried out here and there by enterprising sanatorium superintendents with a scientific bent. An example of such work is to be found in the fifth annual report of the Glenlomond Sanatorium, Kinross. The medical superintendent, Dr. W. T. Munro, has evidently followed the recent investigations in Berlin by Prof. Uhlenhuth, on whose observations on immune sera in the treatment of tuberculosis we have recently commented.[1] Dr. Munro has attempted to reduce the pulse-rate in very toxic cases by injecting the serum of patients who were doing very well. Naturally due regard was paid to the blood groups, and only Wassermann-negative sera were used. In one case the patient's pulse was reduced from an average of 110 to 80–88 every time serum was given. On the suggestion of Sir Robert Philip inunction with a tuberculin ointment has been given in cases of tuberculosis of the glands, and Dr. Munro writes that "we are more impressed with the treatment of massive tuberculous glands by this means than by any other." At the time this report was written about 30 patients were undergoing treatment with Prof. Dreyer's diaplyte vaccine, but of the value of this remedy Dr. Munro reserves his opinion. Of other

[1] THE LANCET, 1923, ii., 943.

modern remedies, collosol calcium has been given an extended trial and has been given up. Dr. Munro has, indeed, never found any drug of any material value in the treatment of pulmonary tuberculosis, and this is a verdict with which probably most sanatorium physicians would reluctantly agree. Some curious observations were made in six cases of hæmoptysis. In every case a hæmolytic streptococcus was found in the sputum, and after these patients had been treated with autogenous vaccines, all improved, and not one has again had an hæmoptysis. Several cases of asthma were investigated on the lines laid down by Noon and Freeman, and an interesting case is related of an epileptic patient who was found sensitive to a coliform bacillus passed in the urine, and who was given an autogenous vaccine. Under this treatment the fits, which had occurred on an average twice a day, were reduced to one per week, tubercle bacilli disappearing from the sputum and the weight increasing by a stone. The serological characteristics of 100 specimens of tubercle bacilli, obtained from the patients' sputum, have been investigated and found to belong to one and the same group. The Fife and Kinross Joint Sanatorium Board is associated in its scheme of research with Prof. W. J. Tulloch, of Dundee, and this association is doubtless of reciprocal value. There are few sights more pathetic than that of a research worker ploughing a lonely furrow without the benefit of that stimulus which rubbing shoulders with other workers provides. And the value of the sanatorium as a research centre is doubtless greatly enhanced by its being linked up with some other centre at which observations can be checked and verified.

## EYELESS SIGHT.[1]

Jules Romains, less known as a physiologist than as a dramatist and literary artist who is not altogether enthusiastic about the medical profession, believes that the general skin surface of the body and some of the adjacent mucous membranes are capable of vision in the sense that completely blind or blindfolded people may recognise colours, persons, geometrical forms, and even read the newspaper by means of their skin. He identifies as accessory eyes some of the many varieties of end-organs in the skin whose precise function has never been determined. The phenomena which he describes are certainly striking. There is no inherent impossibility in the idea that the skin is responsive to the wave-lengths in the ether which we recognise as light, and if there are receptors scattered over the surface it is conceivable that these impressions might be translated into conceptions of external appearances. But a world steeped in the dogmas of physiological optics will require more rigorous proof than the author advances. One pitfall at any rate is quite insufficiently fenced-off. With one exception, the experiments which he cites take no account of telepathy, the object or word or numbers presented to and recognised by, e.g., the chest of the subject being known to someone else who was actually present. If he would take Prof. Richet into collaboration, we could be sure this source of error would be adequately excluded. That telepathy is the explanation of his results is certainly supported by his observation that some degree of attention and the correct frame of mind are necessary for success. The same is, of course, true of common ocular vision, and Mr. Romains makes several points which are frankly against a telepathic interpretation. Success varies roughly with the area of skin exposed, and the skin cannot see in the dark (though the experiments on this point seem a little vague), nor if anything opaque to ordinary light is interposed between it and the object. There is nothing remarkable in his observation that paroptic sight is possible only in the complete absence of ordinary visual sensations. On his thesis in general the only possible comment seems to be, "It may be so." People talk easily of the blind men who find their way so quickly and surely about the streets having developed another sense. Perhaps Mr. Romains has identified it.

[1] Eyeless Sight: A Study of Extra-retinal Vision and the Paroptic Sense. By Jules Romains (Louis Farigoule). Translated by C. K. Ogden. London and New York: G. P. Putnam's Sons. 1924. Pp. 228. 5s.

## GANGRENE OF EXTREMITIES IN PUERPERAL FEVER.

Dr. Victor E. Chesky,[1] of Halstead, Kansas, who records an illustrative case, remarks that puerperal peripheral gangrene, while not common, is liable to occur in any case of puerperal sepsis or septic abortion. Stein in 1916 collected 76 cases, including two of his own, in 63 of which gangrene followed labour, and in four septic abortion, while four occurred during pregnancy, and five followed gynæcological operations. Knipe in 1917 recorded another case following septic abortion, so that with Dr. Chesky's case there are now 78 examples of obstetrical or gynæcological interest on record of gangrene of the extremities. In most cases one or both of the lower extremities was involved. Much less frequently the upper extremities were affected. In only one instance was there symmetrical gangrene of the fingers, toes, and ears. The causative factor in puerperal peripheral gangrene is always infection, which may vary from a very mild form with a low temperature lasting only a few days to the most severe type of puerperal sepsis. Either a streptococcic or a mixed infection is present. The circulatory block is usually situated in the arteries. Puerperal gangrene of venous origin is relatively rare. Contributory causes of thrombosis are low blood pressure and sluggish blood-stream, caused by severe hæmorrhage or weakened heart action, recumbent position and relative immobility of the body, lowered resistance against infection, and abnormal constitution of the blood. The prognosis is bad, the mortality being about 50 per cent. Early amputation of the gangrenous part is the most important step in treatment. Dr. Chesky's case occurred in a vigorous primipara, aged 19, in whom puerperal sepsis developed on the day after delivery. Five days later she complained of numbness in both feet, which became swollen. Dry gangrene of the toes developed and complete recovery followed their removal. Dr. Chesky attributes the gangrene in his case to arterial occlusion, the thrombus being localised in the pelvic vessels.

[1] Surgery, Gynecology, and Obstetrics, January, 1924.

## PURE ETHER.

Prof. Storm van Leeuwen, of Leiden University, in his paper to the Section of Anæsthetics of the Royal Society of Medicine on Friday of last week gave some conclusive evidence as to the narcotic effect of pure ether. The opening of his address showed how the inability to procure ether from Germany, from which country Holland had been accustomed to draw its supplies, gave Dutch manufacturers a new keenness in the production of the drug. Consequently, when there came from England the expressions of doubt as to the efficacy of pure ether, research workers in Holland were besought by the manufacturers for guidance. Thus it was that Prof. van Leeuwen started his admirable, and, as it appears to us, well-nigh unanswerable investigation. Having first of all procured from pure ethyl alcohol the purest ether he could, which boiled at 34·6° C., and having found that this had true narcotic effect, the Professor decided that even with this specimen the narcotic qualities might be attributed to minute impurities present. He prepared, therefore, by the use of benzidene, which crystallises with ether when they are heated together and then cooled, crystals which, when heated, gave an ether of absolute purity. This drug, which had the same boiling point as his former product, proved to be a good narcotic. It was carefully tested both quantitatively and qualitatively on both animals and on man. A series of animals were rendered narcotic with it, observations

on the blood content of ether being made at various points of the narcosis up to that at which the respiratory centre failed. With regard to the effect of impurities in ether, it appeared that, in the small amounts present in ordinary good brands, these play no part in the anæsthetic action of the drug. The only reason for adding any other drug to ether is to render it stable, for pure ether, if kept exposed to light and air, becomes contaminated with peroxides. This happens with ordinary good ethers, but not with the ether of crystallisation, or with ethanesal or Cotton's ether. In the discussion which followed Prof. van Leeuwen's paper Dr. H. H. Dale expressed his concurrence with all the findings described in it, and declared that the apparently opposite conclusions arrived at by Dr. Mackenzie Wallis and Dr. Langton Hewer could only be explained by the assumption that the drug they tested was not the same drug as that tested by himself and by van Leeuwen. Consequently he invited Dr. Wallis when next he had prepared a pure ether which he found to be non-anæsthetic to allow Dr. Dale and his co-workers to have samples of it and test it in conjunction with Dr. Wallis.

## MALARIA THERAPY IN GENERAL PARALYSIS OF THE INSANE.

A WARNING as to the need of caution in the experimental treatment of general paralysis by the inoculation of malaria was the subject of a considered article by Prof. P. Mühlens, of Hamburg, in the *Klinische Wochenschrift* of Dec. 24th, 1923. Indiscriminate use of this method in private practice is strongly condemned, and even in hospitals the new treatment should not be entrusted to any neurologist who has not made himself thoroughly familiar with the clinical symptoms and signs and the parasitology of malaria. Prof. Mühlens points out that the inoculations should only be carried out on individuals whose resisting powers are good and whose paralysis is not of too long duration. The earlier the treatment is started the better are the prospects of success. Before inoculation of a patient it should be ascertained that he can easily take quinine. For malaria inoculation only a pure benign tertian strain should be used, and the progress of the blood infection should be controlled by daily blood tests, in order that when necessary the infection may be checked in time. When it appears from these examinations or from the condition of the patient that the blood infection has suddenly become very severe, quinine should immediately be given. Those treated with malaria should not be allowed to leave an institution before they have been definitely free from parasites for at least three or four weeks. Most of the malaria inoculation deaths which have come to the author's knowledge concerned ill-nourished elderly paralytics, or those whose infection was not continuously and expertly controlled, or who were not early enough treated with quinine. Prof. Mühlens's warnings are based on his desire to avoid bringing into discredit a therapeutic measure which he considers the best method of treatment for general paralysis. He claims that a very high percentage of paralytics treated with malaria and relapsing fever infection have remained for years capable of work and free from relapse.

A memorandum recently issued by the Board of Control draws attention to the differences, some of them important, between the procedure adopted for carrying out the treatment in England and Wales and the procedure which has been usually recommended by the initiators of this therapeutic measure in Austria, and a plea is entered for uniformity of procedure and practice at least in all the British hospitals where trials are being arranged, in order that the merits of the treatment may receive fair consideration. It is recorded that in some instances the induced malaria in the inoculated cases in England has been of an unusually severe type accompanied by pronounced complications and with a tendency to fatality. It is hoped that a strain of parasites which is free from objection on grounds of severity will be available shortly, but in any case if the blood of all inoculated patients is examined daily the occurrence of untoward symptoms and complications may be avoided. This procedure is also required in connexion with the risk, to which Prof. Mühlens draws attention, of unwittingly conveying a mixed infection of benign and malignant parasites from donors of blood who contract their malaria in the tropics. Since it has been shown that the common malaria-carrying mosquito of England (*Anopheles maculipennis*), after sucking blood from inoculated patients, readily becomes infected and capable of spreading malaria to other patients and to the general public, it is essential to take adequate measures to avoid this risk. During the summer months (April to October inclusive) inoculated patients should be kept in a mosquito-proof ward, or under satisfactory mosquito curtains, from the onset of the malarial attacks until careful microscopical blood examination shall have proved that the blood is free from the sexual forms of the parasite. This will usually be the case about three days after commencing a proper course of quinine treatment. As to the danger of relapse it has been contended that an entire absence of relapses is a particular feature of inoculated malaria. In this country, however, what are technically known as "parasitic relapses" have been detected by examination of the blood of patients some weeks after apparent clinical recovery, and in order that these patients should not provide a potential source of spread of malaria it is recommended that blood examinations should continue until freedom from parasites has lasted at least three weeks. It is also considered necessary that, when a patient who has undergone a course of malarial attacks is discharged from the hospital, his name and home address should be notified to the medical officer of health of the district to which he is discharged. The importance of effective quinine treatment and "after-treatment" in the interests equally of the patients and of the public is emphasised.

Details of observations on the blood and cerebrospinal fluid of 40 patients with G.P.I. treated by inoculation with malaria are recorded in our present issue by Dr. A. R. Grant and Dr. J. D. Silverston. Sixteen of the patients received in addition a course of salvarsan, after the malaria had been arrested by quinine. A decrease of the lymphocytosis and in the globulin content of the C.-S.F., and a diminution in the intensity of the W.R. occurred in nearly half the cases. The W.R. of the C.-S.F., the colloidal gamboge reaction, and the colloidal gold test were favourably influenced at a somewhat later period in a smaller number of cases. The observers are content to record their findings at this stage without comment.

## A NEW SERIES OF MEDICAL FACSIMILES.

AN interesting experiment has been made in medical publication by the Oxford University Press acting in conjunction with Messrs. Lier and Co., of Milan. They have produced[1] in photographic facsimile the excessively rare and finely illustrated folio first edition of the "Fasciculus Medicinæ" of Johannes de Ketham, printed at Venice in 1491. This edition, which had a larger page than any of the subsequent issues, is historically important as representing the turning-point for medicine from the Middle Ages to modern times. Beside the facsimile of a remarkable work the volume before us contains also an elaborate account of its sources and affinities, written by Prof. Karl Sudhoff, of Leipzig, and adapted for English readers by Dr. Charles Singer. Of the series of 14

[1] Edition de Luxe, bound in half leather with eight plates coloured by hand, £3 10*s*. A cheaper edition at £2 6*s*. identical with the first save that only one plate is coloured and the binding is half linen. The actual printing and publication is the work of Messrs. Lier, of Milan, for whom the Oxford University Press are acting in this country.

plates drawn from manuscript material, eight have been coloured by hand. Should this beautiful issue of a remarkable work prove successful, the proposal is to produce a whole series of facsimiles of early medical works. The second edition of the "Fasciculus," printed in Venice in 1493, with its woodcuts by the artist of the famous "Hypnerotomachia Poliphili," has been for some time in the press under the editorship of Dr. Singer. The ten earliest fifteenth century tractates on syphilis are almost ready and other volumes have been planned. The series, which is entitled "Monumenta Medica," is under the general editorship of Dr. Henry Sigerist, of Zurich.

## HOLES IN A DETACHED RETINA.

THIS is a condition more often talked about than seen ophthalmoscopically, and when seen has generally been regarded as merely an interesting phenomenon without special clinical significance. A paper in the January number of the *British Journal of Ophthalmology*, by Sir William Lister, contains generalisations which will clear up a number of perplexities in connexion with this condition. The first is that sudden detachment of the retina cannot occur without a hole, a fact first mentioned by Leber in his lectures at Heidelberg in 1882, of which, according to Lister, too little notice has been taken. If we come to think of it, however, the onset of any detachment of the retina without a hole must necessarily be gradual. Transfer of fluid from the vitreous chamber into the inter-retinal space cannot be sudden unless there is a hole. Should there be a hole transfer must be rapid and loss of vision correspondingly sudden. If, therefore, it can be substantiated that the loss of sight from a detachment was not merely suddenly detected, but actually occurred suddenly, we can definitely predict the presence of a hole, whether or not it can be seen by the ophthalmoscope. A second important generalisation is that no cases of detachment of the retina due to neoplasm, when examined pathologically, have been found associated with a hole in the retina. In these cases the detachment is secondary, and due to the exudation of an albuminous fluid quite different from the vitreous, which in cases where a hole is present naturally finds its way through it to the inter-retinal space. We may therefore safely assume that in any case of detachment where a hole is seen by the ophthalmoscope, the presence of an intra-ocular tumour can be excluded. A third point of clinical importance discussed by Sir William Lister is the value of treatment of detachment of a retina in which there is a hole. In any case of detachment treatment is most uncertain in its results. There are few ophthalmic surgeons who could not count all the cases of undoubted cure coming within their experience on the fingers of one hand. Yet, when treatment is successful, the boon to the patient is inestimable. On the other hand, if treatment is attempted at all it is of necessity very irksome to the patient and may involve a waste of valuable time for no good purpose. Therefore the value of Sir William Lister's experience on this subject is considerable. Where the retina is being dragged in by vitreous bands, treatment, or at any rate, any ordinary treatment, is valueless, for even if apparently successful for a time, the condition is certain to recur. When, however, the retina is being pushed in by fluid poured out from the choroid into the inter-retinal space, owing to some low form of inflammation, treatment may be legitimately tried and in rare cases may be successful. Operative treatment in the presence of a hole must necessarily be unavailing, except in the rare cases of peripheral and strictly localised detachment where the affected portion of retina is completely cut off from the rest by adhesions. It is true that some years ago a committee of the Ophthalmological Society [1] reported that among cases of cure investigated there were three (apparently not as the result of operation) in which tears of the retina had been present, and it is difficult to reconcile this with Sir William Lister's generalisation. This aspect of the subject might claim attention from those who have studied detached retina in the past.

[1] Trans. Ophth. Soc., 1916, xxxvi., 354.

## XANTHOMA DIABETICORUM.

ACCORDING to Dr. Ralph H. Major,[1] of the Department of Internal Medicine, University of Kansas School of Medicine, who has collected 74 cases from the literature, as well as three under his own observation, xanthoma diabeticorum was first described by Addison and Gull in the Guy's Hospital Reports in 1850. The condition is most frequent in the male sex, and comparatively uncommon in women, among whom only about ten cases have been recorded. As a rule, it disappears with improvement in the diabetes, although some exceptions have been noted, in which the skin lesions remained stationary or actually increased, in spite of the urine being free from sugar. Bristowe, who reported the second case on record in 1866, described the lesions as showing microscopically a dense fibrillated texture, studded more or less with oil globules of different sizes. Comparatively few observations have been published upon the appearance of the blood or upon the blood chemistry of these cases. Dr. Major's cases, therefore, are of special interest, in that studies were made of the blood-sugar and cholesterol, particularly in relation to treatment by insulin. The first patient was a Jew, aged 43, with a very profuse eruption of xanthoma, who was admitted to hospital with diabetic coma and died a few hours after admission. The blood serum was milky-white and presented a gross lipæmia, and the cholesterol in the blood-plasma was 432 mg. per 100 c.cm. In the other two cases the xanthoma cleared up under the influence of two factors—viz., (1) the disappearance of lipæmia and hypercholesterinæmia as the result of insulin treatment, and (2) the presence of a food supply to the lesions afforded by local injection of a small quantity of ether. Histological examination of excised nodules in the two cases showed a marked fibrosis with infiltration of small mononuclear leucocytes, the xanthoma cells being inconspicuous. A study of sections of the tissue indicated that the xanthomatous nodules were composed of neutral fat, fatty acids, and lipoid bodies, and contained cholesterol.

[1] Johns Hopkins Hospital Bulletin, January, 1924.

AT a meeting of the governors of St. George's Hospital on Monday last H.R.H. Prince George was elected President of the hospital, a post which has been vacant for nine or ten years, having been last held by Princess Christian.

WE regret to announce the sudden death on March 9th of Mr. George Palmerston Newbolt, senior surgeon, Royal Southern Hospital, Liverpool, and newly appointed President of the Liverpool Medical Institution.

MANY of our readers will have seen with lively concern the news that Sir StClair Thomson was among those injured in the accident to the Ventimiglia express near Lyons on March 10th. We are happy to be able to reassure them that his injuries were slight and that he hopes shortly to resume his journey to the Riviera.

UNDER a scheme arranged by the University of London for the exchange of lecturers between England and Holland, Dr. E. Gorter, professor of pædiatry in the University of Leiden, will deliver a lecture to advanced students of pædiatry at the Hospital for Sick Children, Great Ormond-street, W.C. 1, on March 19th at 5 P.M. The subject is the Pathogenesis of Certain Nutritional Disorders, and the lecture will be given in English, illustrated by lantern slides.

# Modern Technique in Treatment.

*A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.*

## LXII.

## MASTURBATION IN YOUNG CHILDREN.

MASTURBATION in infants and young children is probably more common than is generally supposed. It begins sometimes as early as the sixth month, more often during the second year. Thereafter we may meet with it at any time up to or beyond puberty. Treatment will here be considered only of cases in children under 7 years.

The act is performed in various ways—by friction between the adducted thighs, by direct manipulation, or by pressing against the projecting edge of some object such as a chair or table. If thwarted in the attempt, the child may show great restlessness and irritability. If the act is completed, excitement and flushing of the face give way to a strange, drowsy state, with an expression on the child's face which shocks and alarms the mother. It is not easy in such a case to give effective treatment, and yet we may be certain that here, as in enuresis and many other functional nervous disturbances in children, treatment lightly embarked upon which fails of its effect, does more than fail. For failure of treatment which concentrates the child's attention upon the objectionable habit, thereby greatly increases the difficulty of securing ultimate success.

I think it may be best to discuss the subject of treatment under the following heads: (1) The explanation to be given to the mother; (2) the attitude to be adopted to the child; (3) apparatus for restraint; (4) the control of local irritation; (5) the prescription of sedatives.

### 1. *The Explanation to be Given to the Mother.*

Generally we find that the mother is in a state of extreme distress. The action of the child appears to her sinful, alarming, or altogether horrible. She is conscious of her powerlessness to forbid or to control. In all other matters the child may be docile, affectionate, and responsive to the mother's influence. But on this point the mother has, as it were, lost her nerve, and the child feels the sense of unrest. I have known a little girl compelled to give way to the impulse turn to her mother, and then, conscious of the look of unhappiness, wail out, "Smile, Mummy." The mother's power to control is inhibited because she regards the habit as showing a precocious and unnatural sexuality. It is well to begin by explaining the extreme frequency of masturbation and its comparative harmlessness. Symptoms of exhaustion occur only when the act is performed almost incessantly during day and night. Children have no knowledge of all that sex implies to the mother's mind. They will admit to the practice openly and without shame or embarrassment. They will say that it gives them a comfortable feeling. The infant before the intellectual life awakens, before recollection of yesterday's happenings and anticipation of to-morrow's is possible, is prone to solace its moments of vacancy by stimulating certain sensory nerve-endings. One baby will suck its thumbs, another will bang the occiput from side to side on the pillow, another will practise air-swallowing, or the still more difficult art of rumination. As the level of the intellectual pleasures rises these lower physical stimuli tend to lose their appeal. In general, they are kept in being only when persistent efforts are made to forbid and to thwart. Reiterated appeals and apparatus of restraint have the disadvantage that they keep the desire in the forefront of consciousness. Relief from the impulse only comes when the mind is otherwise occupied. Masturbation, the mother should realise, is comparable to head-banging or thumb-sucking. The child has lit upon this particular form of sensory stimulation, and until made aware of the curious stir among grown-up people to which this particular act gives rise, it is practised openly and without shame. The first essential for cure is to banish from the mother's mind the conviction that the child is displaying vicious and criminal propensities which foreshadow a life of sexual excesses and sexual perversions. If she can take a reasonable view of the trouble, we have then made an ally of the strongest force in the child's life.

### 2. *The Attitude to be Adopted to the Child.*

I believe that, in general, the best attitude to adopt to the practice is that it is a deplorable breach of manners, a disgusting habit like spitting or picking the nose. It is right that we should endeavour to provoke in the child a sensitive æsthetic sense which is altogether offended by the act. The faces around the child may show a proper proportion of disgust. But we must be careful to hide that we are alarmed or disquieted by the act or utterly cast down by it. Reiterated appeals to a child to desist from a practice which is causing grief to everyone, nightly repeated urgings to show strength and self-control, are useless. I think we can take it for granted that a little child is not likely to show sufficient self-control to resist successfully once the mind is directed towards the thought. Punishment with little children has no part to play in the treatment. It is ineffective as a deterrent, and carries with it the drawback that the children will be tempted to lie to avoid it. If the child is frank and open about the failing, treatment is rendered easier and much is gained. If the act is practised furtively and in fear, it is more difficult to eradicate because, however hard the parents may play the detective, they can never be sure of their ground and must always be in doubt as to the measure of their success. It is as unwise to show anger as it is to show alarm. As with their elders in similar predicament, the best means of defence is flight to other thoughts and occupations. Change of scene and new and suitable companionship are often at once successful in diverting the child from exclusive concentration upon the ever-present temptation. Separation from a mother whose influence cannot be utilised for good may be necessary. Someone who can make the child's life full, busy, and absorbingly interesting, is sure to succeed.

### 3. *Apparatus for Restraint.*

It is not often, if we have to deal with parents who can carry out a plan such as is suggested above, that we shall fail to get the child's mind diverted from the obsession. The cure of masturbation in the child is to a great extent dependent upon our power to control the atmosphere in the home. Apparatus for restraint need, and I think should, only be used when that control is clearly impossible of achievement. The particular form of restraint, of course, must depend upon the method by which the act is carried out. If the thighs are rubbed together at night or when lying down, it will be enough to adopt any apparatus which prevents the movement—for example, bracelets of webbing, worn above the knees and carrying between them a bar of light metal or wood. If it is practised by manipulation, the hands must be restrained. At the worst, confinement in poroplastic or plaster, such as is worn for spinal caries or poliomyelitis, may be necessary. But whatever device is adopted which mechanically prevents the act, I believe it is of the first importance for success that the child should in no way connect the apparatus with its real object. I believe it is worth while taking endless trouble to convince a little child that his legs are so crooked or his back so one-sided that the apparatus has to be worn to correct the deformity. The desire only passes when the child has forgotten all about it. If the apparatus serves only as a reminder of past excesses, and a prison from which he is powerless to escape in order to indulge once more, then the final removal of the restraint is quite likely to be followed by a giving way all the greater because of the long repression. All the interest and attention

may be concentrated upon the imaginary weakness, while the real enemy sinks out of sight. In young children, with the cessation of the act for some months, the likelihood of relapse is small unless the memory of it has been kept alive by the consciousness of restraint and the daily repeated efforts to prevent. In this connexion I have had one interesting and instructive experience. Almost the worse case I have encountered completely ceased during and after operation for a severe attack of appendicitis. The interest was focused elsewhere. On the other hand, the operation for circumcision, often recommended, has the disadvantage that it directs attention to the sex organs. The operation is not of itself in any way preventive or curative, and should, I think, be avoided when possible. It should be performed only if there is much local irritation under the prepuce, and other means to allay it are unsuccessful.

*4. The Control of Local Irritation.*

I think that the part played by local irritation in keeping up masturbation is slight. It is true that in the past the original act may have been determined by some irritation of prepuce or vulva, but when our advice is sought that is probably ancient history. Any redness or swelling locally is usually the result and not the cause of the masturbation. With little girls especially, the mucous membrane of the vulva may be red and sore. Painting freely with a weak silver nitrate solution, 1·5 per cent., may harden and desensitise, but if this is done with a little child, it is well to make pretence of similarly painting (this time with water) of nose, mouth, ears, &c., as well if by such a plan the attention of the child can be diverted from the sexual organs exclusively. If the urine is too acid, it can be neutralised with potassium citrate 20 or 30 gr. per diem. Thread-worms should be eradicated, but I have not found them often present.

*5. The Prescription of Sedatives.*

Children who masturbate early are more often than not unusually quick, vital, and far advanced for their age. Often there is evidence of exhaustion and overstrain, which renders them irritable, and for the time being prone to masturbate. The nervous exhaustion is clearly as much the cause as the result of the masturbation. It is well that sleep should be deep and long. Chloral hydrate has the great advantage over potassium bromide that it acts almost at once. Five grains of chloral will generally produce sleep immediately in a child of 2 years of age, while small doses of bromide may be combined with it, in the hope that thereby a gradual quieting of the child may be produced.

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# Special Articles.

## THE DIFFERENTIAL DIAGNOSIS AND THE PREVENTION OF SMALL-POX.*

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### THE DIFFERENTIAL DIAGNOSIS OF SMALL-POX.

WITH few exceptions, in cases in which small-pox is in question, we have to rely mainly on our personal observation of a rash which in type more or less closely resembles the rash of small-pox. In the great majority of such cases there is at the time of examination no other evidence available which is of any real value, and in making our diagnosis we are compelled to depend on our estimate of the differential value of the cutaneous signs of small-pox and on that alone.

I do not mean to suggest that no value attaches to the symptoms and signs of the onset of the disease or to the character of the pre-eruptive stage. A history of the occurrence of the classical features of the small-pox invasion may be obtained from the patient; previous cases of the disease may have occurred or one may obtain a definite history of contact with the infection. But there is no symptom or combination of symptoms in the onset of small-pox which has intrinsic value in differentiation. Their evidence is of corroborative value only in the presence of a rash which is suggestive of small-pox, and care is necessary to avoid an over-estimate of this value. The signs of previous vaccination have a very limited value as negative evidence when small-pox is in question. The tendency is to over-estimate this value. Old scars, scars which have lost all pigmentation, have no value. If recent and still active lesions of vaccinia are present, one must remember that small-pox and vaccinia may run their course together. Successful vaccination is possible as late as the last days of the period of incubation. On the other hand, there is not, I believe, any reason to doubt that a successful inoculation of vaccinia made in the presence of a doubtful rash is a sure sign that one is not dealing with small-pox.

* Read at a joint meeting of the Home Counties Branch and the Fever Hospitals Medical Service Group of the Society of Medical Officers of Health, Jan. 25th, 1924.

*Types of Eruption of Small-pox.*

In rare cases the lesion or lesions of inoculated small-pox may be observed at the onset of the disease, and when associated with a definite history of contact with the infection, they are naturally of the greatest assistance in diagnosis.

Small-pox is capable of producing three distinct types of eruption, erythema, purpura, and a focal lesion which is really a vesicle. The erythematous and purpuric eruptions are associated with the primary fever, the erythema more closely with the early period and the purpura with the later period of this stage of the disease, while the focal rash begins to appear towards its end. The coexistence of erythema and a purpuric rash or the imposition of purpuric lesions on an erythema during a short period of observation will suggest the possibility of the presence of small-pox. The association of an erythema in a similar way with an eruption of the focal type will very strongly suggest small-pox, and if the combination of a focal eruption with a purpuric rash occurs, then the diagnosis of small-pox is very frequently correct and the gravest suspicion is always justifiable. It is to be noted that in cases of small-pox which show the last combination particularly, the lesions of the focal rash may be very few and widely scattered and may present few or none of the classical features of the small-pox lesion. They may be flat, dull-white vesicles, oval or perhaps irregular in contour, and apparently of shallow position in the skin. The commonest form of the erythema of small-pox is associated with the mild and modified attack. It is a patchy condition, of indefinite features, varying in the size of its patches, which are irregularly distributed, tending to be evanescent and migratory and not appreciably raised above the surface. This form of the erythema appears on the face only in rare cases, and still more rarely passes further over the face than the surface of the lower jaw and the adjacent parts of the cheeks. It is usually considered that measles is the disease for which this form of the erythema is most apt to be mistaken. But mistakes in this direction do not seem to be frequent and much greater confusion occurs between measles and the early stages of severe confluent small-pox, particularly in the child. A "measles" rash which is distinctly papular may be very difficult to differentiate from small-pox, and isolation of cases of this type for observation is always justifiable.

*Erythema Distinctive of Small-pox.*

The negative and indefinite characters of this common form of the erythema of small-pox have

obviously little differential value in themselves. They acquire value when associated with a rash of the focal type present at the time of first observation or imposed on the erythema during an observation period of a few hours. In rare cases the erythema assumes more positive features in the disposition of the rash to the surface, in the colour and size and contour of its patches. These cases are toxic in significance and may occur in the course of outbreaks of small-pox of severe type. Large areas of a brilliant colour, almost vermilion at times, may be seen on the extensor surfaces of the larger joints, or extending along the radial surface of the lower part of the forearm and of the hand or along the corresponding surfaces of the leg and foot. These patches are usually symmetrical and may be associated with plaques of a similar character on the trunk. A well-defined margin is a frequent feature of these patches, and sometimes one may find somewhere within an erythematous area on the trunk a papular lesion with hæmorrhage within and around it. This form of the erythema is apparently distinctive of small-pox. Other rare cases occur in which with the onset of the disease the whole surface, trunk, extremities, and face, is covered by a continuous sheet of erythema. In its beginning this rash is very similar in appearance to the flush which may follow a hot bath. It is usually associated with an onset of extreme violence. It is evenly distributed and universal, and in these respects, as well as in the lack of a punctate character, it is unlike the rash of scarlet fever. The beginning of the purpuric rash of the flexures may be a simple erythema from which the colour is easily expressed.

*The Purpuric Sign.*

These examples of the erythema are toxic in character, and the advent of the purpuric sign is not usually long delayed. The subsequent course of such cases may be dominated by the purpuric lesions which rapidly increase in number and size while the erythema fades, leaving staining. The patient may die without any development of the focal rash. The purpuric lesions by their number and severity appear to usurp the position of the focal lesions. Or the focal rash may appear as a very discrete eruption of hæmorrhagic papules which go on to form vesicles of the type already described, having hæmorrhage within and around them. More frequently the confluence of the focal eruption causes an appearance of swelling of the skin of the face and perhaps also of the hands. The individual lesions cannot be distinguished by touch on the face and only with difficulty on the hands. The skin of the forehead is thickened and immobile and the cause of the condition may not be apparent. But the more discrete foci on the trunk and other parts in such cases are easy to recognise. In very rare cases of this type life is prolonged sufficiently to allow of confluent vesiculation to take place. Extensive tearing of the pellicle may be caused by the restless delirium of the patient, and the case may terminate with the appearance of a severe exfoliative dermatitis.

Mistakes in cases of the most severe toxic type of small-pox may arise on account of the almost complete suppression of the focal rash, or rather the replacement of that rash by purpuric lesions. But in the majority of the cases the extreme severity of the purpura, the association of erythema with purpura, or the imposition of a focal eruption, however discrete, on a severe purpuric rash should be sufficient for diagnosis. The most frequent cause of error is the concentration of the attention on the most prominent feature of the illness, the toxæmia, which is assumed to be sufficient as a diagnosis, and the disease as well as the cause of death is labelled "blood poisoning."

Not much more need be said of the purpuric sign in small-pox. The use of this term is convenient because it includes all the purpuric conditions which may occur, the hæmorrhages from mucous surfaces as well as the hæmorrhages in mucous membranes and skin. It is the sign of toxæmia and it may be found at times in cases of almost every infection. Its manifestation in the skin varies in severity from the slight staining which may be left by the fading erythema or the small bright red petechial lesions which have their site of election in the flexures of the surface to the deep-seated, massive, bruise-like hæmorrhages, and the purple, almost black blotch of a large area of more superficial extravasation. Neither in form nor in position is the sign peculiar to small-pox. The differential value in small-pox depends mainly on a greater average severity in this disease and possibly on a greater average frequency than in other infections. Of the severity of the sign in small-pox, the petechial rash of the flexures is an illustration. Similar rashes may be seen in scarlet fever and in cases of food poisoning. But in small-pox the condition is remarkable for the density of the setting of the petechiæ and also for the extent of the area involved.

A general estimate of the differential value of the sign in small-pox may be expressed in this way: Given the onset of a feverish illness which points to the presence of an acute infection and is accompanied by the purpuric sign, small-pox should be considered to occupy the first position as a possible cause of the condition, and the probability that small-pox is the cause increases with the severity of the purpuric eruption, having regard to the number of the lesions, to their type, and also to the amount of general involvement of the skin.

*The Focal Rash.*

Ricketts's term for the characteristic rash distinguishes it from the other types of eruption which may occur in the disease. It is a rash made up of a varying number of units or foci pathologically identical. The greater differential value may be ascribed to the features of the unit or to the features of the rash. By his investigations Ricketts showed that the features of the rash, and particularly the position of the lesion on the skin—that is, the relation of the rash to the surface of the body or the distribution of the rash—have a much greater differential value than the features of the unit.

*Features of the Unit.*

The life-history of the lesion is essentially the life-history of a vesicle which has its origin in a small sharply-defined inflammatory focus in the deeper layers of the epidermis. It is a process of deep-seated vesicle formation. In the typical lesion clinical evidence of the nature of this process begins to appear as soon as the papular element is recognisable. It attains its greatest prominence when vesicle formation becomes apparent. It gradually recedes from view as pustulation advances until at the end of the process, when only the crust remains, the evidence has almost completely disappeared, and the identification of the lesion depends almost entirely on its situation on the surface of the body. Appreciation of the true nature of the process, that it is a deep-seated vesicle formation, will assist in the differentiation of several conditions which are at times mistaken for small-pox, such as most cases of acne and of measles, many cases of urticaria, of secondary syphilitic eruptions, and the lesions caused by insect bites.

*Value of Anatomical Evidence.*

It is unnecessary for our purpose to consider in detail the clinical evidence by which the nature of the pathological process may be recognised—namely, the evidence of the depth of the focus in the papular and vesicular stages, the observation and meaning of loculation and umbilication of the vesicle, the evidence of the onset of pustulation, the features of the crust, and how they depend on the anatomical character of the skin of the part on which it is situated. The differential value of this anatomical evidence is limited. It is transient. It is based on the anatomical features of the typical lesion which are in continuous change throughout the evolution. It is also dependent on a comparison between these features and those of other focal lesions, and is therefore very subject to the influence of the personal factor of the observer. In

the abnormal lesion, produced by conditions which interfere with the regular course of the evolution, clinical evidence of the nature of the process is always partially concealed, and in extreme cases differentiation from other focal lesions may be quite impossible.

Abnormal lesions, or modified lesions, to use the term in the meaning of any clinical departure from type, may occur in old age, or as the result of long continued ill-health. In these conditions the skin shares in the general depression and may fail to react in the normal way to the presence of the inflammatory focus. The lesion in such cases is apt to be less prominent in the vesicular stage, to be flat, ill-defined, and sometimes irregular in contour. It may resemble rather closely the lesion of varicella. Lesions of similar characters may be seen in the severe toxic attack, scattered over the surface here and there amongst the much more evident purpuric lesions. The abnormal characters in these cases may be the result of the over-whelming toxæmia.

*Important Abnormalities in the Lesion.*

The most important abnormalities in the lesion are the result of the existence in the patient of a degree of protection, natural or acquired, against the disease. A partial immunity, to use a convenient term, has a two-fold effect on the focal rash. The decrease which it usually brings about in the number of the lesions is the less important because it involves no interference with the clinical evidence of the nature of the inflammatory process. The more important effect is the decrease in the severity of the inflammatory process, involving a general decrease in the size of the lesions, a greater variation in their size than is seen in the normal rash, and a general speeding up of the clinical changes which occur in the course of the evolution. The result is that the papule is usually smaller than the normal small-pox papule, the vesicle and pustule do not involve the whole papule, and if the immunity is of high degree, the appearance of a small crust set on the top of a hypertrophied papule, in two or three days after the beginning of the outcrop of the rash, may be the only evidence available that vesiculation and pustulation have taken place in the lesion. That is to say, the clinical evidence of the nature of the process may be almost completely destroyed. The speeding up of the changes of evolution may become evident at any stage of the process, and in some lesions a true abortion of the process from the papular stage may occur. It is true that in the majority of cases of modified small-pox a proportion of the lesions will be found to conform more closely to type, but in a rash of very low numerical value it may be impossible to find reliable evidence of a deep-seated vesicle formation in any of its lesions at any time. The most valuable differential feature of the lesion, the unit of the rash, is not found in any of its anatomical characters, but in the fact that the process of evolution, even in the normal lesion, is regular and continuous and rapid. Appearances change from day to day and almost from hour to hour in the typical lesion, and only a very short period is required to demonstrate this feature, which has the additional advantage that it is not concealed but rather emphasised by the increased speed of the evolution under the influence of a partial immunity.

*Differential Value of Distribution of Small-pox Rash.*

Ricketts's researches and his demonstration of the supreme differential value of the features of the small-pox distribution are founded upon two independent observations which had been made several years before he began his work.

(*a*) It had been observed that the rash of natural small-pox has a tendency to affect the face and extremities in preference to the trunk; that on the trunk it is usually more densely set on the upper than on the lower parts, tending to avoid the lower part of the abdominal wall, and particularly the groin, the site of election of the petechial lesions; also that on the extremities the rash prefers the distal to the proximal parts—that is to say, the rash of small-pox is centrifugal rather than centripetal.

(*b*) It had also been observed that the lesions of the focal rash tend to cluster on and around an area which has been subjected to pressure or to the irritation of a local application. Experiment had shown that the irritation, in order to produce this effect, must be in action before or during the incubation period, because when applied after the onset of the disease no increase in the incidence of the rash on the affected part was observed.

To the study of these "irritation patches" Ricketts applied the pathology of inflammation and formed the opinion that irritation brought about an increased incidence of the lesions on the affected part through the disturbance which it caused in the peripheral circulation of the part. It is unnecessary for our purpose further to discuss Ricketts's convincing theory of the origin of the lesion, but one may summarise the conclusions to which he was led by his observations and experiments on the quality of the "irritation" which is necessary or desirable, if one may so speak, in order that the effect on the incidence of the rash may be most obvious. This quality is not severity. Severe irritation, sufficiently severe in itself or by reason of the duration of its application, tends not to increase the incidence, but to have the opposite effect, if the disturbance of the circulation is carried beyond the earliest stages of the process of inflammation. The "irritation," which amounts to no more than a slight stimulation, of which the patient may be quite unconscious, more especially when constantly repeated with slight intermissions, produces a very obvious effect in increasing the incidence of the rash on the affected part. The disturbance brought about in the circulation may be said to amount to no more than an increase in the normal oscillation of the current through the part, and never reaches the later static phase.

If the incidence of the rash can be influenced in so marked a manner by irritation which may amount to no more than a slight stimulation, is it not possible that a similar influence may be at work in producing the well-recognised natural tendency of the lesions to select certain areas in preference to others? Are there any conditions common to those areas which are analogous to irritative conditions in their effect on the circulation? Ricketts's reply to these questions is best given in his own words: "The operative causes are manifold, but the most potent factors are exposure to air and friction with clothing, and to their efficacy every case of small-pox is a testimonial."

*Results of Protection of Part from Exposure and Friction.*

Ricketts completed his demonstration by showing that the actual protection of a part from exposure and friction caused a decrease in the incidence in comparison with the corresponding part which was left unprotected. He had noted in instances in which small-pox followed surgical operation on the extremities that the part of the limb which was covered by wool and bandage appeared to be less affected by the rash than the corresponding part on the other side of the body, and he demonstrated the same result by direct experiment and noted that it is necessary to apply the protection not later than the onset of the disease, in order that any result may be obtained. This conclusion corresponds to the conclusion reached by a former observer regarding the time of application of an irritant in order that an increased incidence of the rash may occur.

Therefore, the parts of the surface which by their position or by their contour are naturally protected from exposure and friction are the parts on which the incidence of the rash is less evident, and the more complete and continuous the protection is, the greater is the tendency for the rash to avoid the protected part. For example, the most constantly and completely protected parts of the surface are usually the fold of the groin and the depth of the axilla, and these are the parts which the focal rash most consistently avoids.

The distribution of the focal rash of small-pox is governed by two factors, exposure and protection. These factors are common to every member of the race. They are independent of the course of the disease, of the evolutionary changes which constitute the features of the lesion, and of the modification of these changes which is the result of a partial immunity. The features of the distribution begin to be established with the beginning of the outcrop, they are fully established when outcrop is completed, and they remain unchanged as long as the rash lasts. The natural disposition of the focal rash to the surface of the body is modified only by individual peculiarities of habit and environment, and these local modifications of incidence are not usually difficult to interpret, and are more apt to assist than to hinder the recognition of the disease.

*The Significance of Variation in Type of Infection in Small-pox.*

The nature of an infection which has flourished almost continuously during recent years in many parts of the country has aroused considerable discussion, and suggestions have been made that the disease differs from normal small-pox and chicken-pox to an extent sufficient to justify the belief that it is a distinct disease, perhaps intermediate in character between small-pox and chicken-pox, or perhaps a hybrid, a varioloid varicella, or that it is a fixed variant of small-pox. In support of these suggestions attention has been directed to the almost complete absence of fatality, notwithstanding a high proportion of unvaccinated individuals among the patients, and also to the occurrence in unvaccinated patients of eruptions abnormal in character and therefore suggestive of the presence of a considerable degree of protection against the disease.

There is no doubt that a number of cases have occurred, and continue to occur, in the same districts where these abnormalities have been noted, in which the course of the disease and the features of the distribution of the rash, as well as the features of the lesions in their evolution, cannot be distinguished from the conditions recognised as typical small-pox. It is to be noted also that the abnormal conditions which have been emphasised concern the less important features of the evolution of the lesion and do not refer to the more important features of the distribution of the rash. There is also no apparent doubt that the relationship between many of the cases and vaccinia is identical with the relationship between vaccinia and small-pox. The very low rate of fatality or the complete absence of fatality cannot be used as an argument against the opinion that the disease is true small-pox. Great variation in fatality-rates is a well-recognised feature of epidemics. This variation has its value in indicating variation in type of disease, but has no value in differentiating one disease from another. It has an epidemiological and not a clinical significance.

There appears to be no doubt that small-pox has existed in many parts of the country during recent years, that it continues to flourish and to spread and has now become endemic in several districts. Fortunately, it is a mild type of the infection, and only in this respect may be regarded as a variant of small-pox. Whether it is a fixed variant or may at some time assume the features of the more virulent disease is a question on which it is advisable to reserve an opinion.

*(To be concluded.)*

## IRELAND.

(FROM OUR OWN CORRESPONDENT.)

*Inspectors of the Local Government Department.*

RECENTLY, in response to demands made in the Dail, the Government made a return showing the numbers of inspectors employed by the Local Government Department in 1914, in 1920, and in 1923, with the salaries paid. Although the area under the control of the Department has been diminished by six counties since 1914, the number of inspectors has increased from 8 medical and 28 lay in 1914 to 9 medical and 29 lay last year. At present the medical inspectors are paid salaries as follows: five receive from £500 to £700 a year with bonus, one £500 with bonus, one £420 to £600 with bonus, and two £700 inclusive. Of the 29 lay inspectors no less than nine receive either as much as, or more than, the most highly-paid medical inspectors. Of these nine, six get £500 to £700 with bonus, one £700 to £800 with bonus, one £700 to £900 with bonus, and one £1000 with bonus. It is not easy to see why the lay inspectors should be more highly paid than the medical. A medical inspector has undergone a long and arduous training before qualification, and has probably spent several years in the practice of his profession before being appointed to an inspectorship. A professional inspector should, therefore, receive higher remuneration than another. Some of the inspectors classed as lay are, no doubt, engineers, and therefore entitled to whatever advantages a professional status brings with it, but there seems to be no reason why engineering inspectors should be better paid than their medical colleagues.

*The Free State Army Medical Service.*

Major-General F. Morrin, who succeeded Major-General Hayes nearly a year ago as head of the Medical Service of the Free State Army, has now retired. General Morrin, who had previously served in the Royal Army Medical Corps, has been in the Medical Service of the Free State Army since it was founded nearly two years ago, and until his appointment last April as Director of the Service he was operating surgeon at the Curragh. He now returns to civil life and to his duties as one of the assistant surgeons to St. Vincent's Hospital. He was entertained to dinner last week, on his retirement, by the officers of the Medical Service, who made him a presentation in token of their appreciation of his conduct as head of the Service. In addition to the medical officers present, General Mulcahy (Minister of Defence), General M'Mahon (Chief of Staff), General O'Sullivan (Adjutant-General), and other officers holding high command attended and took part in the proceedings. The country is much in debt to both General Hayes and General Morrin for the work they have done for the Army under great difficulties and to the sacrifice of their private interests. The new head of the Medical Service is Colonel T. Higgins, who has been in the Service since its foundation, and previously served in the Royal Army Medical Corps.

*University of Dublin.*

The Senate of the University of Dublin has approved for the Honorary Degree of Doctor in Medicine the name of Surgeon Vice-Admiral Joseph Chambers, Medical Director-General of the British Navy. Admiral Chambers is a graduate of Dublin, and the first of that University to reach the highest medical post in the Navy. The Royal College of Physicians of Ireland recently elected him to an Honorary Fellowship.

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RETIREMENT OF PROF. HILL ABRAM. — Prof. John Hill Abram, who for over 40 years has been connected with the Medical School of the University of Liverpool as student, lecturer, and professor, has just retired from the Chair of Medicine which he has held for the last two years. Prof. Abram has also given up his appointment on the staff of the Royal Infirmary, where for over 20 years he has been senior honorary physician. He will, however, continue in private practice. During his long association with the Medical School, Prof. Abram has been successively medical registrar, lecturer on pathology and clinical medicine, professor of therapeutics for 14 years, and he was appointed professor of medicine in 1922. On March 7th the students presented him in the Surgery Theatre of the University with a water-colour as a token of their appreciation, admiration, and affection. A humorous touch was added to the proceedings, when in addition to the picture there was handed to the professor a rather forbidding birch rod, which was described as "The Insignia of the Order of the Birch, presented for conspicuous merit in the application of the Art over an extensive period."

# Correspondence.

"Audi alteram partem."

## PREPARING HANDS AND GLOVES FOR OPERATION.

*To the Editor of* THE LANCET.

SIR,—Both Dr. G. W. Theobald and I wish to thank you for the kind and also amusing leading article which you devoted to our communication in the last issue of THE LANCET. We feel, however, that some of your criticisms should be answered, but since these were directed chiefly to the question of the bacteriological technique involved I, as the one responsible for that technique, am replying.

You state: "It is an essential part of the method that some reliance is placed on antiseptics and in particular on 1/1000 biniodide of mercury." What you were good enough to publish was merely an abstract, but in the complete communication Dr. Theobald dealt with the question of the antiseptic, pointed out that any disinfectant in any strength might be employed, and suggested that, if desired, concentrated sulphuric acid might be used. Even if your criticism of 1/1000 biniodide was entirely justified the method can still stand, as the use of biniodide 1/1000 is in no way fundamental. That solution was adopted chiefly because it was the one previously in common use for the preparation of hands in the Rotunda Hospital.

Again you state: "We must for the present feel a certain hesitation in accepting, sine grano salis, the statement made that gloves infected with virulent pus can be sterilised by mechanical washing and the use of dilute antiseptics." May I venture to offer the necessary grain of salt in the hope that it will make our contention sufficiently palatable for you to swallow? In one case a glove was contaminated with pus, blood, fæces, &c.; in the other it was covered with a culture of *B. coli*, which culture was made in a medium containing equal parts of broth and hydrocele fluid. In the second case the glove was dried before it was treated by Dr. Theobald's method, and it is believed that the conditions obtaining on it were exactly comparable to those on a glove contaminated with pus and other body fluids and then allowed to dry. When examined the gloves appeared to be sterile. This could only have been due to one or other of two things:—

1. All the bacteria had been removed or destroyed and the gloves were sterile.

2. An error had been made; the bacteria were still present and living but could not grow.

You appear to incline to the second view and in support of it you say: "Now, recent work has shown that, in general, mercurial solutions merely prevent growth and do not destroy bacteria," and you suggest that sodium thiosulphate should have been used to render inert any biniodide remaining. I am well aware, as is every bacteriologist who has performed tests of the germicidal power of disinfectants, of the danger of confusing inhibition of growth with actual destruction of bacteria. So far is this from being recent that it was realised many years ago when the "thread" method of testing germicidal power was in use, for ammonium sulphide or hydrogen sulphide was employed to render inert all traces of mercurial antiseptics before cultures were made. Such precautions were not considered necessary in our experiments because the gloves after treatment with biniodide were held under a stream of sterile water to remove all traces of that substance. I regret that this was not stated in our abstract, but our consideration for your valuable space led us to omit much which we should have liked to include. Supposing, however, that the disinfectant had not been removed, what would have been the concentration of biniodide in the cultures? It is just conceivable that as much as 0·5 c.cm. of the 1/1000 biniodide might remain on the glove if the washing had been omitted. This would be diluted 1/20 in saline and of this dilution 1·0 c.cm. would be added to about 15 c.cm. of agar. In the agar culture, therefore, the concentration of biniodide would be—$1/20 \times 1/15 \times 1/1000 = 1/300{,}000$. In the experiments made on the hands in gloves containing biniodide solution, the precaution of washing the hands before examination was not taken and yet, in one case, where the examined hand was tested while still wet with what had, originally at least, been 1/1000 biniodide, 14,700 bacteria were found to be present.

I realise that the question of inhibition is serious, and when I read your leader it struck me, as at least possible, that you were right and I was wrong. Since mere opinion must give place to definite evidence, I performed an experiment on Saturday to discover what concentration of biniodide would have an inhibiting effect under conditions similar to those prevailing in my tests. Various dilutions of biniodide in water were made and amounts of these were added to tubes of agar melted and cooled to 50° C., so as to give a series of tubes of agar containing biniodide in concentrations ranging from 1/10,000 to 1/500,000; two additional tubes received a similar amount of sterile water to act as controls. Two laboratory (not social) hands were scrubbed in sterile saline (20 c.cm.) and plates were made from the series of agar tubes, 1·0 c.cm. of the washings being added to each. To-day I have counted the colonies in the plates and the results are as follows:—

| Agar with— | Colonies. | Agar with— | Colonies. |
|---|---|---|---|
| 1/10,000 biniodide | 0 | 1/250,000 biniodide | 2330 |
| 1/25,000 ,, | 0 | 1/300,000 ,, | 2900 |
| 1/50,000 ,, | 0 | 1/400,000 ,, | 2680 |
| 1/75,000 ,, | 0 | 1/500,000 ,, | 2220 |
| 1/100,000 ,, | 0 | Agar without biniodide | 2780 |
| 1/150,000 ,, | 0 | ,, ,, | 2490 |
| 1/200,000 ,, | 2180 | | |

Despite the fact that the hands of the laboratory worker examined were too heavily contaminated with bacteria to give quite satisfactory plates, it is clear that under the conditions of my original tests, a smaller concentration of biniodide than 1/200,000 does not cause any serious inhibition of growth, and I claim that the method of testing employed was valid and, as a natural conclusion, that Dr. Theobald is justified in his contention that his treatment does sterilise "gloves infected with virulent pus." The bacteria were either removed or destroyed, and not merely anæsthetised.

I apologise for the length of this letter, but feared that condensation might only lead to further misinterpretation.—I am, Sir, yours faithfully,

JOSEPH W. BIGGER.

School of Pathology, Trinity College, Dublin, March 10th.

## PETROL FOR SURGICAL SKIN TOILETTE.

*To the Editor of* THE LANCET.

SIR,—May I through your columns call attention to the use of petrol as an efficient substitute for ether in cleansing the skin for operation purposes? I have used this substance for this purpose for over 12 years with entirely satisfactory results. While at home recently I found that ether soap was the material used for this purpose at my old hospital (the London) and no doubt at other hospitals in the Kingdom. The amount of money annually expended in this way must be very great. I take absorbent cotton-wool as it comes from the manufacturer, wet it with petrol and scrub the skin with successive swabs until they come off clean. I then paint the skin with tr. iodi made from methylated spirit and cover with a sterilised towel. This is done the night before and repeated again on the operating table. I find that petrol is quite as efficient as ether in the extraction of fat and dirt from the skin, thus allowing the iodine to penetrate. I use ordinary petrol and my results are quite as good as they were in the days when I used ether soap.—I am, Sir, yours faithfully,

F. J. W. PORTER,
Major, R.A.M.C. (retd.)

Surgical Nursing Home, Bombay, Feb. 12th, 1924.

## TESTS FOR CURE OF GONORRHŒA IN WOMEN.

*To the Editor of* THE LANCET.

SIR,—In your issue of March 1st Mr. J. J. Abraham rates the value of cultures in the examination of women with gonorrhœa so low as "useless" when compared with films. His experiences, however, are somewhat unusual. Using hydrocele agar or serum agar, overgrowth by other organisms is seldom of consequence in the female, and, as is to be expected, more "positives" are obtained by culture than by film:—

| | |
|---|---|
| Cultures and films from women .. .. .. | 220 |
| Positive by culture .. .. .. .. | 53 |
| „ „ film.. .. .. .. .. | 42 |

Furthermore, the culture method is safer, because the worker has both morphological *and* cultural characters to aid him. Indeed, the value of cultures over films in women is considered so marked here that, by arrangement with Mr. Hugh Lett and Dr. A. M. Simpson, routine films have been dispensed with, and cultures are taken by the staff in the women's clinic.—We are, Sir, yours faithfully,

PAUL FILDES.
London Hospital, E., March 6th, 1924. G. T. WESTERN.

## CERTIFICATES OF INSANITY.

*To the Editor of* THE LANCET.

SIR,—I trust that you will lend your influential aid in endeavouring to relieve the profession from the risks that it unnecessarily runs in signing the present certificates of insanity. The legislature demands that a person suffering from dangerous insanity should be deprived of his liberty, and it is the duty of the legislature to provide that the detention is necessary and right. A non-official general practitioner is not the servant of the legislature, and should therefore not be required to take any responsible part in carrying out its objects; his duty only consists in advising the treatment necessary. If he voluntarily undertakes to aid the legislature by giving an opinion, with the facts on which that opinion is based, he should not be held responsible for the action that the legislature takes upon that opinion and testimony, and the certificate should be framed in accordance with this principle.

I therefore suggest that after paragraph 5 in the medical certificate of insanity form some addition should be made to the effect that, since the facts stated may reveal secrets obtained professionally, the certificate should be regarded as privileged and should not be revealed, in any way that could lead to the injury of the signer, legally or otherwise. I suggest that the whole profession should unite to obtain this protection from the legislature, or alternatively decline to sign certificates in the present form.

I am, Sir, yours faithfully,
March 5th, 1924. H. RAYNER.

## CHOLESTEROL AND TUBERCULOSIS.

*To the Editor of* THE LANCET.

SIR,—I am anxious to know whether any serious trial has been made of cholesterol as a therapeutic adjuvant in cases of tuberculosis, especially pulmonary tuberculosis—either by methodically increasing the cholesterol-intake in the diet or by other medicinal methods. In the careful résumé of hitherto tried treatment given by Dr. R. A. Young in his second Lettsomian lecture, on March 5th, no mention of cholesterol was made. Perhaps readers of THE LANCET can inform me on the subject. A high cholesterol-content in the blood is supposed by some to indicate good resistance towards bacterial infections, and it is remarkable that in diseases often associated with hypercholesterinæmia—gout, arterial atheroma, arteriosclerosis, chronic interstitial nephritis, and chronic cholelithiasis—there seems to be considerable antagonism towards acute pulmonary tuberculosis. Diabetes mellitus, though often associated with hypercholesterinæmia, should be placed on one side, as apparently the hyperglycæmia and wasting favour pulmonary tuberculosis. It would also be interesting to know whether methodical reduction of the cholesterol in-take in the diet can diminish the liability to arterial atheroma, &c. The experimental production of aortic atheroma in rabbits by cholesterol-feeding can hardly be taken as strong evidence, since rabbits are peculiarly liable to atheroma.

I am, Sir, yours faithfully,
London, W., March 6th, 1924. F. PARKES WEBER.

## INHALATION IN THE TREATMENT OF PULMONARY TUBERCULOSIS.

*To the Editor of* THE LANCET.

SIR,—In his second Lettsomian lecture on the treatment of pulmonary tuberculosis, reported in your last issue, Dr. R. A. Young has given a place to inhalations in his survey of various methods of treatment. I have been using inhalation in conjunction with sanatorium treatment for the last 25 years with considerable benefit. The mixture I am in favour of is one containing guaiacol, terebene, menthol, ol. pin. pumil., chloroform, and rectified spirit with or without tinct. iodine or formalin (2½ to 5 per cent.), which is manufactured by Oppenheimer, Son, and Co., London. The inhalation relieves the patient's cough, determines more blood to his lungs like Kuhn's mask, protects him from strong winds and dust, and prevents any infectious cold or catarrh of the nose and throat from spreading downwards and starting fresh mischief in the lungs, and thus in many ways it helps to arrest the disease. Its results are striking when it is used continuously and perseveringly.

I am, Sir, yours faithfully,
Mendip Hills Sanatorium, March 10th, 1924. C. MUTHU.

## THE POSITION OF NON-PANEL PRACTICE.

*To the Editor of* THE LANCET.

SIR,—The National Medical Union of Non-panel Medical Practitioners is accumulating evidence to lay before the approaching Royal Commission. As the whole system of panel medical practice is to come under review, it is very important that the non-panel case should be adequately presented.

With a view to assisting the Royal Commission to come to a clear decision on the merits of the Medical Benefit Section of the National Health Insurance Acts, all insured persons are requested earnestly to reply to the two following questions:—

A. Are you satisfied with the present panel medical system?

*Answer* .....

B. If not, would you prefer to make your own arrangements for medical attendance, receiving when sick a certain amount of money towards your medical expenses, and consulting the doctor of your choice?

*Answer* .....

I am, Sir, yours faithfully,
E. H. WORTH, M.R.C.S.
(for the Hon. Secs., N.M.U.).
11, Chandos-street, Cavendish-square, W., March 5th.

## STAPLE HOLDERS FOR ROUX'S OPERATION.

*To the Editor of* THE LANCET.

SIR,—In your issue for March 1st (p. 465) Mr. C. M. Page's staple holder is shown. I was not aware of his invention, which resembles in idea my own. Mr. Page's staple holder is for the Roux staple and unless altered it would be useless to take the Jacöel. I think the advantage of my staple holder over that of Mr. Page is that the sides of the staple are in no way obscured by the holder.

I am, Sir, yours faithfully,
Glasgow, March 5th, 1924. A. MACLENNAN.

## A "GRADED FACTORY" FOR TUBERCULOUS PATIENTS AND EX-PATIENTS.

*To the Editor of* THE LANCET.

SIR,—I have had my attention drawn to a statement I made in my article with this title. I wrote: "Some sanatoria are self-supporting and even make a profit." I should be glad to correct this statement so that it may run: "Some sanatoria are maintained well under their estimates and thereby have a good balance in hand."

I am, Sir, yours faithfully,

CHARLES F. PEDLEY.

Winsley Sanatorium, nr. Bath, March 3rd, 1924.

## POST-OPERATIVE INSANITY.

*To the Editor of* THE LANCET.

SIR,—The case described by Dr. A. J. Cokkinis in your issue of March 8th is of great interest. His suggestion that his patient's unfortunate condition is due to minute focal hæmorrhages or thromboses destroying certain association fibres in the silent areas of the brain is probably the correct solution. At the same time it is doubtful whether a resection of the nasal septum is justifiable in elderly patients, save, possibly, under exceptional circumstances. In the majority of persons over fifty I am always chary of advising such operations. An experience of over a thousand has taught me that the rapidity of recovery varies in direct proportion with the age of the patient.

I am, Sir, yours faithfully,

MACLEOD YEARSLEY.

Wimpole-street, W., March 8th, 1924.

## ITALIAN LABELS ON PROPRIETARY MEDICINES.

*To the Editor of* THE LANCET.

SIR,—Our attention has been called to an article entitled, Secret Remedies: Formulas Disclosed by the Makers, published in your issue of Feb. 2nd. These formulas have apparently been obtained from Italian sources. Among them is found one for "Collis Browne's Chlorodyne." As the headlines and the introductory paragraph of your article suggest that these formulas are given by the makers themselves, we beg to inform you that we have never "disclosed" our formula.

From a recent experience of our own we are led to suggest that you have been misled. An order for Dr. J. Collis Browne's Chlorodyne was placed with us by an Italian firm. Accompanying it came a parcel of small labels bearing a formula which the firm requested us to attach to our bottles. We refused. Surprise was then expressed at our refusal "*as the formula-label was only required for preferential Customs tariff purposes.*" We send a specimen for your information. You will note that it is different again from the one which you publish.

> Cloroformio Puro 6.00, Est. Liquorizia Acquoso 12.00, Cloridrato di Morfina 0.15, Essenza di Menta 0.10, Miele depurato 25.00, Sciroppo Semplice q. b. per fare 100.00.

It is evident that certain Italians must be affixing anything they like to proprietaries imported into or sold in Italy by them without consulting the makers.

We are, Sir, yours faithfully,

J. T. DAVENPORT, LTD.

London, March 10th, 1924.

THE PEOPLE'S LEAGUE OF HEALTH.—Prof. J. C. Drummond will deliver the fifth lecture of the Sims Woodhead series of Constructive Educational Health lectures, which the People's League of Health is giving at the Medical Society of London, 11, Chandos-street, Cavendish-square, W. 1, on March 10th, at 6 P.M., the subject being Food. Further particulars can be obtained from Miss Olga Nethersole, the People's League of Health, 12, Stratford-place, W. 1.

# Obituary.

## ANN ELIZABETH CLARK, M.D.BERNE, M.R.C.P.I.

THE death of Dr. Annie Clark on Feb. 25th in her eightieth year removes one of the few remaining pioneers of women in medicine. Her death occurred at Street, Somerset, whither she had returned on retiring from active practice in 1914.

Ann Elizabeth Clark was born at Street in September, 1844, the seventh of the 14 children of James and Eleanor Clark (née Stephens). Privately educated at Laura-place, Bath, it was not until late in her twenties that she began to study for university entrance. Joining Sophia Jex-Blake, Agnes McLaren, and Edith Pechey at Edinburgh, she moved to London in 1874 when women students were excluded

DR. ANNIE CLARK.

from Edinburgh, and obtained a medical degree in 1877 after two years' study at Berne, where Theodore Kocher was a good friend to her. A year later the Royal College of Physicians of Ireland admitted her as a licentiate, and after further study in Paris, Vienna, and Boston, she went to Birmingham in 1878 as resident medical officer to the Midland Hospital for Women, later becoming the first woman on its honorary staff. She was also for more than 20 years on the staff of the Children's Hospital.

In Birmingham Dr. Annie Clark soon built up a large private practice, notably among poor people. Not richly endowed with the gifts and graces which make it easy to gain popularity in social life, she had a sure instinct for what was possible and practicable in any given household. "She always seemed to know exactly what to do," her patients said of her, and she was sometimes criticised for allowing herself to become exhausted through sympathy for those to whom she ministered. At the Women's Hospital she was associated in succession with Mr. Lawson Tait, Mr. J. W. Taylor, and Mr. Frederick Edge—not having the F.R.C.S. she did not operate herself in the hospital—and the last-named writes thus of her:—

"For anyone who had not worked with Dr. Annie Clark it would be difficult to believe that such a quiet little oldish woman doctor could have had the strong kindly influence over her colleagues which she always exerted. There were

men of strong character about her and working with her, but it is no exaggeration to state that not one of her colleagues influenced the tone and standard of the hospital more than she did. In life it comes as a revelation to see how much a noble mind, conscious of right, can effect, and how little it counts whether that mind be in a body of slight form or in a massive frame. In this instance we had a gentle, retiring woman with a great tolerant understanding, beloved by all who knew her. Whatever happened in the way of blunder, or neglect, or unworthy practice, meriting and perhaps receiving blame from others, nothing but sympathy and wise counsel came from her. At a time when there was among medical men much suspicion and some mild fear of medical women, which to some slight degree may have been justified by the advertisement and publicity given by the lay press to anything connected with women entering the profession, it was like a soothing balsam to know and work with this fine example of what a medical woman could be."

As one of the senior members on the staff of the Children's Hospital she was ever ready to discuss new methods and ideas with her juniors, seeking how to bring the results of investigations, which they had more time than she to carry out, to the service of the patients. One of the juniors writes of her aptitude for seeing the practical bearing of pathology and bacteriology in her ward work, adding: "Dr. Clark was ready generously to acknowledge any assistance thus given her by even the youngest member of the staff. There was a quiet happiness about her that won the regard of those associated with her." Her habit of speaking the truth without evasion was carried far beyond what is usual in every-day life. If a patient asked a question to which the answer was painful she believed it right always to tell the truth, holding that the sick person had a right to this straight dealing. From the first she refused to order alcohol for her patients. She demanded the best of people on account of believing the best of them. Her patients had a sense of her devotion to their interests, and when she left Birmingham they raised a sum of £750 to endow a bed at the home for cancer cases started by her and a few colleagues.

After retiring to Street, where she lived with a younger sister, Dr. Annie Clark was able to enjoy more fully her absorbing hobbies of travel, botany, and archæology. Her advice was still available at the local baby clinic, and she acted for some time as hon. secretary of the Belgian Committee. As she became physically more invalid her interest in life never flagged. Her last illness was of only a week's duration. Her body was cremated at Birmingham on Feb. 29th, and the ashes laid in the Friends' Burial Ground at Street.

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## HENRY ALEXIS THOMSON, F.R.C.S. ED. & ENG.

BY the death of Emeritus Prof. Alexis Thomson at Algeciras in his sixty-first year, on March 4th, there passes from the Edinburgh Medical School one of its most prominent and popular figures. Last October Prof. Thomson formally retired from the chair of systematic surgery in Edinburgh University, which he had held for the past 14 years, as ill-health prohibited further professional duties.

Prof. Thomson, one of the seven sons of an eminent Edinburgh business man, was born in Edinburgh in 1863, and passed his schooldays at the Royal High School there. Before taking up the study of medicine he spent two years at the Realhochschule of Hanover, and in France, where he acquired an intimate knowledge of French and German. At the University of Edinburgh he distinguished himself among his fellow medical students, gaining medals in both systematic and clinical surgery, and graduating with honours in 1885 at the age of 22. In the same year he became a Member of the Royal College of Surgeons of England, of which body, many years later, he was elected a Fellow.

After graduation he acted as house surgeon in the Sick Children's Hospital and in the Royal Infirmary under Mr. John Duncan, whose clinical tutor and private assistant he afterwards became. After a few months' experience in general practice he commenced practice as a surgeon in 1887, and in the following year was elected a Fellow of the Royal College of Surgeons of Edinburgh. At this time, along with Mr. Harold Stiles, he ran a most successful coaching class in anatomy and pathology for the second professional examination. He was one of the earliest workers in the College of Physicians laboratory when this was in Lauriston-lane, and it was here that he did a great deal of the work for his M.D. thesis on Tuberculosis of Bones and Joints, for which he received a gold medal five years after graduation, and was appointed joint holder of the Freeland-Barbour Fellowship by the Royal College of Physicians. He acted for a time as assistant to Prof. Greenfield, and to this experience, no doubt, was due in part his keen and sustained interest in surgical pathology. In 1888 he became a B.Sc. in public health. About this time he started lecturing on surgery in Minto House, where he was associated with Symington. In 1892 he was appointed assistant surgeon to the Royal Infirmary, and two years later surgeon to the newly opened Deaconess Hospital. On the retiral of Prof. Chiene in 1909, he was appointed, after a close contest with Mr. James Hodsdon, to the vacant chair of systematic surgery.

During his years of professorship there were few students who attended his morning lectures who did not feel the spell of his personality and his refreshing vigour. He had a naturally attractive voice and never at a loss for a word, he presented his subject with a racy force that appealed to the imagination and aided the memory, while his skill with instance and illustration constantly added a lighter touch. His lectures were always carefully prepared, but he could lecture at a moment's notice, presenting his subject as fluently and as carefully as if there had been time for the usual preparation. In addition to the spoken word, he made a point of illustrating his lectures by demonstrations, and was one of the first to introduce the epidiascope, and later was probably the first surgeon in this country to employ the cinematograph for teaching purposes. In this way rare cases and exceptional operations could be demonstrated to his lecture class by films made under his own supervision. His interest in the students was not confined to their work, for he was an enthusiastic supporter of the athletic club and followed its activities keenly. He delighted to entertain a number of students or residents from the infirmary at his country house in Gilmerton when the felling of trees and the sawing of logs formed an integral part of the programme along with tennis or croquet. He himself was a keen sportsman, golf, shooting, fishing, and bicycling claiming in him a devotee. As an operator he was skilful and daring. He was at his best in difficult and dangerous cases, and his results were often brilliant. He had a *flair* for diagnosis, his gift at times being almost uncanny. In the technique and organisation of surgery he was one of the first to recognise the great progress which had developed in America, and he did much to incorporate in his own practice the improvements and methods observed on his many visits to American clinics, where he was always an honoured visitor.

Much of Prof. Thomson's reputation was due to the valuable contributions he made to medical literature. His original writings covered a wide part of the field of modern surgery. One of his best known contributions was a monograph on Neuroma and Neurofibromatosis, which was published in 1900, and later was translated into French. He wrote frequently for the medical journals, and especially in the *Edinburgh Medical Journal*, of which he was joint editor for several years. With his colleague, Mr. Alexander Miles, he published in 1904 a manual of surgery, in two volumes. Since then the manual has passed through numerous editions, and has been extended to four volumes. This text-book has been recognised as one of the best in the English language. Prof. Thomson was a member of Council of the Royal

College of Surgeons of Edinburgh, and frequently represented the College at medical congresses abroad; but for his health he would have succeeded to the Presidency of the College in the year of his retirement. He was consulting surgeon to the Royal Infirmary and to the Deaconess Hospital, and enjoyed honorary membership of the French Association of Surgeons and of the American Society of Clinical Surgery, and an Honorary Fellowship of the American Surgical Association. During the war he acted as consulting surgeon to the Third Army of the British Expeditionary Force, and for his services was awarded the C.M.G.

Prof. Thomson was buried at Gibraltar, and is survived by his wife.

### GUY ALFRED WYON, M.D. EDIN.

Dr. G. A. Wyon, lecturer in pathology at the University of Leeds, died on March 2nd, in his fortieth year, after a short illness of influenzal character.

Guy Alfred Wyon was a son of Allan Wyon, F.S.A., the medallist, who belonged to the family of engravers of that name so long associated with the Mint. He was born in Hampstead in 1885, went to school at Highgate, and then graduated B.Sc. at London University. He received his medical education at Edinburgh University, qualifying M.B., Ch.B. in 1910, and there five years later he obtained his M.D. After some experience as house surgeon and house physician at the East Suffolk and Ipswich Hospital, and later as a general practitioner in the East End of London, Dr. Wyon joined the R.A.M.C. in 1915 and was sent to Salonika. On returning from that theatre of war, however, the strong bent of his mind for medical work of a scientific character asserted itself, and under the Medical Research Committee he was associated with the late Prof. Benjamin Moore in some useful work on the causation and prevention of T.N.T. poisoning, which is described in the M.R.C. Report, No. 58. He spent the latter part of the war in France attached to the 13th Casualty Clearing Station, and was busy with researches in all the quieter periods. These he carried out in the different mobile laboratories which were attached to the Casualty Clearing Station. About the time of the Armistice he took charge of No. 16 Mobile Laboratory and worked in the neighbourhood of Namur until demobilised.

Dr. Wyon joined the department of pathology at Leeds University in December, 1919, and occupied the position of lecturer in that department at the time of his death. While at Leeds he published some interesting work on bacterial nutrition, with special reference to the significance of amino-acids and vitamins. Tall in stature and possessed of an unusual gentleness of character, Wyon was an arresting personality and he had won a special place for himself in the hearts of many at the University of Leeds which will not easily be filled. As a worker he had two specially marked characteristics: one was his anxiety to get at the fundamental aspects of all problems which he tackled, and the other his enthusiasm and alacrity in bringing new methods to bear on his work. The contribution which he made to progress in the centre in which he worked was much greater than can be gauged by his published work alone. He is survived by his widow, formerly Miss Hitchcock, of Bures, Suffolk, and three children.

THE LATE DR. CLEMENT HADLEY.—The death is announced of Dr. Clement Hadley, second son of the late John Joseph Hadley, M.R.C.S., of Birmingham, at Leicester on March 11th, in his seventy-ninth year. Dr. Hadley qualified M.R.C.S. Eng. 1871, and L.R.C.P.I. & L.M. 1880, and subsequently practised at Ashted-row, Birmingham, for over 30 years, and at Shilton, near Coventry, for 14 years. He leaves a widow and two sons and two daughters.

UNIVERSITY OF LIVERPOOL.—Dr. John Hay, senior hon. physician to the Royal Infirmary, has been appointed Professor of Medicine at the University.

# Medical News.

UNIVERSITY OF CAMBRIDGE: *The John Lucas Walker Studentship.*—Applications for this studentship, the holder of which shall devote himself (or herself) to original research in pathology, are invited, and should be sent, accompanied by copies of papers containing published work, testimonials, and references, before May 1st next, to Prof. H. R. Dean, Pathological Laboratory, Medical School, Cambridge, to whom also applications for further information regarding the studentship may be addressed. The studentship is of the annual value of £300, and is tenable, under certain conditions, for three years from May 31st, 1924.

ROYAL COLLEGE OF PHYSICIANS OF LONDON.—The usual list of Fellows, Members, and extra-licentiate has just been issued, this time separately from that of licentiates and diplomates in special subjects; 14 Fellows were admitted during the year 1923, the total number now being 374. The senior Fellows are: (1870) Sir William Selby Church and Sir Dyce Duckworth, (1873) Sir Richard Douglas Powell, (1874) Dr. Henry Gervis and Dr. John Buckley Bradbury, (1876) Sir David Ferrier, (1877) Dr. Michael Grabham, (1878) Dr. J. Mitchell Bruce and Dr. C. G. H. Bäumler, (1879) Sir John Williams. Fifty-nine Members were admitted during the year, the total number now being 636. The senior Members are: (1860) Dr. Clarence Cooper, (1865) Dr. Heywood Smith, (1866) Dr. Francis V. Paxton.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—A meeting of Fellows will be held at the College on July 3rd for the election of three Fellows into the Council in the vacancies occasioned by rotational retirement. The occasion will mark an innovation, for a reception will be held by the President and Council from 4 to 6 P.M. on the same day, and the annual exhibition of additions to the museum will be open for inspection at that time. Formerly, when Fellows had to attend at the College to record their votes, the annual exhibition of additions to the museum was held on the day of the Council election, but in recent years the exhibition has been held in October. It is now proposed to revert to the custom of holding the exhibition on the same day as the Council election, and to hold a reception in connexion with it.

JOULE MEMORIAL LECTURE.—The third memorial Joule lecture was delivered on March 4th at the rooms of the Manchester Literary and Philosophical Society, by Prof. A. V. Hill, who took for his subject Thermodynamics in Physiology. He said that the guiding principles in the life and labour of Joule—those of precise measure and accurate definition—were the essential needs of physiology at the present time, and the hour would come when physiology would find its Einstein, its Maxwell, and its Laplace, but to-day it required a Joule—indeed, a dozen Joules—to carry out accurate measurements and to formulate precise definitions which were essential if it was to secure its promotion from the nursery of observation and wonder to the school-room of exact science.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION.—A three weeks' course on Diseases of Children will be given at the Royal Waterloo Hospital for Children and Women from March 17th to April 5th. The various aspects of the subject will be dealt with by lecture-demonstrations, ward work, and out-patient clinics by the members of the staff according to the time-table set out in the syllabus. At the Royal Westminster Ophthalmic Hospital there will be a course on Ophthalmology from March 31st to April 17th, which will include clinical instruction every afternoon from 2 P.M., and special demonstrations twice a week on Medical Ophthalmology and Methods of Examination. At the London Temperance Hospital, Hampstead-road, there will be an intensive course from March 31st to April 12th. Practical demonstrations will be given each morning from 10.15 to 12.15, and the afternoons, from 2 to 4 P.M., will be devoted to ward rounds and out-patient clinics. In addition, special demonstrations will be given on Saturdays at Bethlem Royal Hospital on Mental Diseases, and on Ophthalmology at the Royal Westminster Ophthalmic Hospital. There will also be a lecture each day at 4.30 P.M., to which all members of the medical profession are invited, and the opening one will be given by Sir Humphry Rolleston on March 31st, followed among others, by Mr. V. Zachary Cope, Mr. Ernest Clarke, Dr. Soltau Fenwick, and Mr. W. Ernest Miles. Copies of the syllabus with full particulars can be obtained on application to the Secretary to the Fellowship of Medicine, 1, Wimpole-street, London, W. 1.

Mr. R. A. Bickersteth, F.R.C.S. Eng., honorary consulting surgeon to the Royal Infirmary, Liverpool, died at Bournemouth, on March 6th, in his sixty-second year.

HARVEIAN SOCIETY OF LONDON.—A meeting will will be held at Paddington Town Hall on March 20th, at 8.30 P.M., when Prof. J. Ernest Frazer will deliver the annual Harveian lecture.

CHELSEA CLINICAL SOCIETY.—A meeting of the Society will take place at St. George's Hospital on March 18th at 8.30 P.M., when a discussion on the Treatment of Common Eye Disorders will be opened by Dr. Ernest Clarke.

ELIZABETH GARRETT ANDERSON HOSPITAL.—The annual meeting of the hospital, Euston-road, N.W., will be held to-day, Friday, March 14th, at 3 P.M., under the chairmanship of Lord Riddell. Mrs. Fawcett will speak.

RADIUM INSTITUTE, LONDON.—With the approval of the King, Sir Anthony A. Bowlby has been elected Chairman of the Institute in place of the late Sir Malcolm Morris. Sir George Blacker has been elected a member of the Committee.

WEST KENT MEDICO-CHIRURGICAL SOCIETY.—The sixth meeting of the session will be held at the Miller General Hospital, Greenwich, to-day, Friday, March 14th, at 8.45 P.M., when a paper will be read by Dr. Montague L. Hine on the Interdependence of Ophthalmology and General Medicine.

HARNETT *v.* BOND AND ADAM: STAY OF EXECUTION.—In the King's Bench Division on March 11th Mr. Justice Lush granted Dr. G. H. Adam an extension of a stay of execution with regard to the damages awarded against him. This followed on an assurance given by counsel for the Crown that security would be given for the outstanding damages of £20,000 before March 21st. Extension was granted without any condition until the hearing of the appeal.

SOCIETY OF MEDICAL OFFICERS OF HEALTH: *Maternity and Child Welfare Group.*—A meeting of this group will be held in the house of the society, 1, Upper Montague-street, Russell-square, W.C., at 8 P.M., on March 20th. Dr. Robert Hutchison will read a paper, illustrated by lantern slides, on the Feeding of Children after the Period of Infancy. The lecture is open to all interested in maternity and child welfare work, and members of the dental and school medical groups are invited to attend.

THE JOURNAL OF LARYNGOLOGY, LIMITED.—The conductors of the *Journal of Laryngology* held their annual dinner on Friday, March 7th, at Pagani's Restaurant. Sir William Milligan presided, and gave the toast of The Prosperity of the Journal in a speech explaining the sound grounds on which those responsible believed that the progress already made was likely to continue. The editor of the *Journal*, Dr. Logan Turner, gave figures which showed that the journal was well supported, but had a right to count upon many more adherents. The toast of The Guests was replied to by Sir Charles Ballance and Sir Squire Sprigge, who bore testimony to the industry and accuracy which were required to make adequate abstracts of scientific communications.

INSURANCE FUNDS AND VOLUNTARY HOSPITALS.—In reply to the statement made by Lord Colwyn at the annual meeting of the Manchester Children's Hospital concerning the surplus funds of approved societies (THE LANCET, March 8th, p. 521), a letter has appeared in the press from Sir Thomas Neill, chairman of the National Amalgamated Society. Sir Thomas Neill states that it is true that the last valuation of approved societies disclosed a surplus of £17,000,000, but of this amount £8,000,000 was set aside by the Government Valúers as a reserve. The remaining £9,000,000 was declared disposable, and in accordance with the provisions of the National Insurance Acts was distributed by the various societies among their members in the form of certain benefits defined in the Acts—including dental, optical, and home convalescent treatment, the provision of medical and surgical appliances, and contributions to voluntary hospitals in respect of the treatment of insured persons. The Industrial Assurance Approved Societies, which adminster benefits to over six million insured persons out of a total of 15 million insured persons, has contributed over £174,000 to voluntary hospitals throughout the country, and Manchester institutions have received over £5400. It is the earnest hope of the approved societies that all available surplus shall be used to the utmost to support voluntary hospitals, because by doing this many wards and beds have been kept open which would otherwise have been closed down.

THE King has sanctioned the following appointments to the Order of the Hospital of St. John of Jerusalem in England: Sir Gould May, Sir John Bland-Sutton, P.R.C.S., and Captain James Atkin Henton White, R.A.M.C., to be Knights of Grace; and Dr. Alfred Bakewell Howitt to be an Esquire.

ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.—At the monthly meeting of the Faculty on March 3rd Dr. James Duncan Maclaren was admitted as an Honorary Fellow, and Dr. Dattatraya Ganesh Kotibhaskar was admitted (after examination) as a Fellow.

Dr. Robert Hunter Steen, medical superintendent of the City of London Mental Hospital, has resigned the post of professor of psychological medicine and out-patient physician for mental diseases at King's College Hospital, Denmark Hill, and the Council of King's College has conferred upon him the title of Emeritus Professor of Psychological Medicine.

KING EDWARD'S HOSPITAL FUND FOR LONDON.—Hospitals in the County of London or within nine miles of Charing Cross, desiring to participate in the grants made by this Fund for the year 1924, should make application before March 31st to the hon. secretaries of the Fund at 7, Walbrook, London, E.C. 4. Applications will also be considered from convalescent homes which are situated within the above boundaries or which, being situated outside, take a large proportion of patients from London.

ENCEPHALITIS LETHARGICA IN ENGLAND AND WALES.—Cases of this infectious disease to the number of 86 were notified in England and Wales during the week ended March 1st, the numbers in preceding weeks (working backwards) being 61, 33, 37, 19, 18, 18, 10, 8, taking them back to the beginning of the year. Of the 86 cases the districts of notification were: County of London 3 (Bethnal Green, Fulham, Stepney); Cheshire 8 (Birkenhead 1, Stockport 2, urban districts 5); Cumberland, 1; Derby, 1; Dorset, 1; Durham, 2; Essex, 3; Kent, 1; Lancashire, 58 (Blackpool 1, Bolton 3, Bury 1, Liverpool 2, Manchester 22, Oldham 6, Rochdale 1, Salford 9, Ashton-under-Lyne 1, Eccles 1, Ince-in-Makerfield 1, Irlam 1, Middleton 1, Radcliffe 1, Swinton and Pendlebury 1, Tyldesley with Shakerley 1, Westhoughton 1, Whitefield 1, Whitworth 2, Worsley 1); Hants, 1 (Winchester); Surrey, 1; Sussex, 1; Warwick, 2 (Birmingham); Yorks, W.R., 2 (Halifax 1, Hemsworth 1); Glamorgan, 1. It will be seen that the adjacent counties of Lancaster and Chester account for all but 20 of the cases.

NORFOLK AND NORWICH HOSPITAL.—At a recent quarterly meeting of the governors of this hospital the report of the board of management showed that the number of in-patients admitted during the quarter had been 823, compared with 778 in the corresponding quarter of last year. The daily average of in-patients was 239, and the number of operations performed 739. The number of cases treated in the out-patient department had been 1079 (1084 last year), and the accidents and casualties 1767, as against 1520 last year. The board reported that they anticipated that the heating and hot-water supply from the new boiler-house would be connected up during the next few weeks, and that the extensions to the electrotherapeutic department, as well as the extensions and alterations to the laundry, were nearing completion. Mr. Donald Day, senior surgeon to the hospital, had retired, and was appointed a consulting surgeon. Mr. A. J. Blaxland was promoted to the post of honorary surgeon, and Mr. W. B. Bulman was appointed honorary assistant surgeon. A new arrangement had been made with regard to children operated on in the out-patient department for the removal of tonsils and adenoids. For the future these patients would be transported to their own homes in ambulances provided by the British Red Cross Society at a small charge. Mr. S. H. Barton, chairman of the board of management, in moving the adoption of the report, made special reference to the treatment of cases of diabetes by insulin, and stated that this hospital was one of the first to adopt this treatment. There had been as many as 14 such cases at one time under treatment, and the usual number was eight. Such specialised treatment as this created a demand for beds, but owing to the cost of insulin it threw a strain on the finances of the hospital. The ward which had been reserved for discharged soldiers was now available for civilian cases, as there were now only eight soldiers in the hospital, against 40 last year. This would throw an additional burden on the hospital finances, as there would be a loss in payments of over £1500, but the board felt that the civilian patients, and especially the members of the Contributory Scheme, who formed 70 per cent. of the number, would do all in their power to assist in making up the deficit.

NATIONAL BUREAU FOR PROMOTING THE GENERAL WELFARE OF THE DEAF.—Under the auspices of this Bureau an important conference of societies engaged in the promotion of the welfare of the deaf will be held at the Kingsway Hall, Kingsway, London, W.C., on March 19th, at 3 P.M., when Lord Charnwood will preside.

WELSH NATIONAL SCHOOL OF MEDICINE.—The Senate of the University of London has now recognised the final years of study held at the Cardiff Royal Infirmary as courses qualifying for the examinations of the University of London. Prof. Graham Brown has succeeded Prof. A. M. Kennedy as dean of the school.

MEDICO-LEGAL SOCIETY.—A meeting will be held at 11, Chandos-street, Cavendish-square, London, W. 1, on March 18th at 8.30 P.M., when notes will be read on Cases of Sudden Death from Inhibition and their Medico-Legal Bearings, by Dr. Percy B. Spurgin and Sir Bernard Spilsbury. Any members who can contribute notes of similar cases are requested to take part in the discussion.

DONATIONS AND BEQUESTS.—For the British Empire campaign the following donations have been received recently: £1000 from Mr. Jackson Russell, of Archerfield, Dirleton, East Lothian; £1111 collected by the County of London Branch, British Red Cross Society, including £1000 raised by the Holborn Division (Commandant, Miss Geering); and £200 from Mr. S. G. Asher, chairman of the council, Middlesex Hospital Medical School. A large number of anonymous gifts have also been received.

MAUDSLEY HOSPITAL.—The second part of the seventh course of lectures and practical courses of instruction for the diploma in psychological medicine will begin on March 31st. Lectures will be given by Dr. Bernard Hart, Dr. Edward Mapother, Sir Frederick Mott, Dr. C. Hubert Bond, Dr. F. C. Shrubsall, and Dr. W. C. Sullivan, and 12 clinical demonstrations in neurology will be given by Sir Frederick Mott and Dr. F. L. Golla. Further particulars will be sent on application to the director of the pathological laboratory at the hospital, Denmark Hill, London, S.E. 5.

THE INSULIN TREATMENT OF DIABETES IN SCOTLAND.—The Scottish Board of Health have had under consideration the position of Poor-law authorities in relation to the provision of insulin treatment for diabetic patients. In regard to persons actually on the roll of poor it is obviously the duty of the parish council to provide whatever medical treatment and medicines the medical officer considers necessary, and the Board do not anticipate that any parish council will raise difficulties in cases where the medical officer considers that insulin should be administered. There is a further class of patient in respect of whom the parish council may be called upon to consider an application for the provision of insulin treatment. That is the patient who is in possession of means which, according to normal Poor-law standards would be sufficient for his ordinary maintenance. Such means may not, however, be sufficient to enable him to purchase the insulin necessary at its present cost, and he may suffer hardship through inability to obtain it. The Board accordingly recommend parish councils to give sympathetic consideration to any application for assistance in the provision of insulin by or on behalf of any person falling within the class referred to above.

CATHOLIC MEDICAL GUILD FOR EDINBURGH.—The inaugural meeting of the Catholic Medical Guild of Sts. Luke, Cosmas, and Damian was held at the Lauriston Hall, Edinburgh, on Feb. 21st. Dr. George Matheson Cullen is the Master of the Guild, with the Rev. Thomas J. Agius, M.D., for spiritual director and Dr. Isabel M. A. Doeg as hon. secretary. The guests included Canon Mullan, Canon McGettigan, Fr. J. Nicholson, Fr. Lennon. Mgr. T. Miley proffered an apology for his inability to attend. The address was given by Dr. Thomas J. Colvin, of the Glasgow Branch of the Guild. He dwelt on the widespread influence of the Catholic Medical Guild, not only in the British Isles but on the Continent and wherever the Catholic faith was spread. Its importance as a means of adjusting medico-ethical relations and of spreading sound scientific and moral principles might be gauged by the activities of the various branches. After a vote of thanks to the speaker, the meeting took up a discussion on birth-control, examining it in relation to the natural law, to the marriage contract, the duties towards society and the Supreme Lawgiver, as well as in its relation towards the fact of Christianity. On each of these four main grounds the meeting rejected and condemned the artificial interference with the physiological and psychological laws of reproduction as contrary to the Christian code of morality and against the natural law.

The official organ of the Catholic Medical Guild is the *Catholic Medical Guardian*, edited by Lieut.-Colonel P. W. O'Gorman, C.M.G., I.M.S., and published by Messrs. Burns, Oates, and Washbourne, 28, Orchard-street, London, S.W. 1.

# Parliamentary Intelligence.

## HOUSE OF COMMONS.

TUESDAY, MARCH 4TH.

*Encephalitis Lethargica.*

Mr. ALFRED T. DAVIES asked the Minister of Health whether there had recently been an increase of sleepy sickness (encephalitis lethargica) in various districts; to what was this increase attributed; and what were the conclusions of the medical experts who had been dealing with the situation.—Mr. WHEATLEY replied: The notification returns show that encephalitis lethargica has increased in prevalence during the past four weeks, but that this increase has occurred almost entirely in Lancashire. The disease is one which shows notable seasonal variations, both general and local, but the cause of these variations is at present obscure.

WEDNESDAY, MARCH 5TH.

*Insurance Patients in Poor-law Hospitals.*

Sir KINGSLEY WOOD asked the Minister of Health whether he had received any representations from boards of guardians calling attention to the number of persons insured under the National Insurance Acts who were admitted to Poor-law hospitals and in respect of whom the guardians were precluded from receiving any benefit for the treatment afforded; and whether he proposed to take any action in the matter.—Mr. WHEATLEY replied: Representations to the effect referred to by the hon. Member have been received, but I would point out that boards of guardians have the ordinary powers of recovery of expenses incurred by them in providing treatment in a Poor-law hospital to a person insured under the National Health Insurance Acts as in the case of all other persons for whom such treatment is provided.

*Wrongful Detention in an Asylum Case.*

Mr. PENNY asked the Attorney-General whether the whole or any part of the damages awarded against the defendants in a case of wrongful detention in an asylum tried in the King's Bench Division of the High Court of Justice recently was to be paid by the Crown.—Mr. WHEATLEY replied: An appeal is being entered against the judgment in this case. Under the judgment the sum of £5000 is to be paid to the plaintiff by the defendant, Dr. Bond. In accordance with the principle always observed where a public servant is sued in respect of actions taken in performance of his duty and the Crown undertakes the defence, this sum will be paid from public funds. An advance of £5000 is accordingly being made from the Civil Contingencies Fund, and the House will be asked to vote this sum and any further sum that may be found necessary by a supplementary vote on the Board of Control estimates. As the appeal case is sub judice it would not, I think, be possible to debate the case in the House pending the result.

*Dissolution of Poplar and Stepney Asylum District.*

Mr. LANSBURY asked the Minister of Health whether he was aware that the guardians of the Poplar parish were very strongly opposed to the dissolution of the Poplar and Stepney sick asylum district recently sanctioned by him; whether he would explain why he had agreed to the amalgamation of the Poor-law unions within the Stepney borough into one union, leaving Poplar as the one parish in the Tower Hamlets outside the scheme; and whether, in view of the fact that the Government was now pledged to deal with the reform of the Poor-law, he would reconsider his decision and postpone the dissolution of the district and the unification of the unions named above until the whole question of the reform of the Poor-law had been dealt with in a comprehensive manner.—Mr. WHEATLEY replied: I am aware of the facts stated in the first part of the question. The change which I have approved is in the direction of making Poor-law and municipal areas conterminous, and, as my hon. friend knows, it is not to take effect until March 31st, 1925. If a scheme of reform is brought into operation before that date this particular question will no doubt be merged in the larger issue, but in the meantime I see no need to alter my decision.

*Trevethin Report and Venereal Disease.*

Mr. WALTER GUINNESS asked the Minister of Health whether Clause 16 of the Trevethin Report dealing with the expenditure of money for reducing venereal disease has yet been considered by the Government; whether the question of Government financial assistance to the work of voluntary institutions has been decided; and whether, in view of the fact that the Society for the Prevention of Venereal Disease and the National Council for Combating Venereal Diseases had both unconditionally accepted the Trevethin Report, and had met in conference and had determined on joint

action for giving effect to its recommendations, he will cause the maximum grant, which is to be made by the Government, to be divided in an equitable proportion between the two organisations.—Mr. WHEATLEY replied: I have now under consideration the recommendations in the Trevethin Report, including the question of financial assistance from the Exchequer to the work of voluntary organisations, but I am not yet in a position to say how any Government grant for this purpose will be allocated.

*Overcrowding and Small-pox.*

Mr. FRANK LEE asked the Minister of Health whether he will direct medical officers of health to take note of the number of rooms in each house from which cases of small-pox are reported with the number of people living therein with a view to ascertaining whether, and, if so, to what extent, overcrowding has any bearing upon the prevalence of the disease.—Mr. WHEATLEY replied: Medical officers of health have already been asked to attempt to measure the influence of domestic overcrowding upon the incidence of notified diseases, and this is their usual practice. I will consider whether it is practicable to do anything further in regard to small-pox.

*Immunising Children against Diphtheria.*

Major MOULTON asked the Minister of Health whether his attention had been drawn to the remarkable results obtained by the Department of Health in New York in immunising children against diphtheria: and whether he proposed to take steps to enable parents who desire it to obtain the advantages of this treatment for their children free of charge.—Mr. WHEATLEY replied: The answer to the first part of the question is in the affirmative. This form of preventive treatment was the subject of a special medical report by my department in 1921, and in July, 1922, a memorandum was issued to local authorities drawing attention to the practical advantages of the method. The question of offering the treatment to parents is for the decision of local authorities or the managing bodies of institutions, but my department has offered expert advice and assistance in the application of the treatment by those who desire to adopt it.

THURSDAY, MARCH 6TH.

*Amalgamation of Naval and Military Hospitals.*

Commander BELLAIRS asked the Chancellor of the Exchequer whether any advance had been made in amalgamating naval and military hospitals in different parts of the world and selling the surplus sites; and what had been the decision in regard to the military parade ground and naval hospital at Hong Kong, which occupy valuable sites and the former of which the business community of Hong Kong had been anxious to buy for a long time.—Mr. SNOWDEN replied: The War Office has assumed responsibility for the treatment of all naval sick at Gibraltar, and the Admiralty has taken over the treatment of military sick at Chatham, with the result that one naval and one military hospital has been closed. As regards Hong Kong, negotiations are proceeding between the War Office and the Colonial Government for an exchange of properties, which include the existing parade ground and military hospital. If and when a settlement of this question is reached the question of the hospital accommodation required by the navy and the army will be reconsidered.

*Sanatorium Schools for Tuberculous Children.*

Mr. TURNER asked the President of the Board of Education whether he would reconsider the restrictions imposed in Circular 1270, issued by the Board on July 5th, 1922, under which the grant payable to the managers of voluntary sanatorium schools for tuberculous children was to be limited in respect of 1922–23 to the amount payable on the average attendance for the year 1921–22.—Mr. C. TREVELYAN replied: I do not propose to maintain the restrictions imposed by Circular 1270 on the amount of grant payable to managers of voluntary sanatorium schools which are in receipt of grant from the Board.

*Deaths from Lead Poisoning.*

Mr. EDMUND HARVEY asked the Secretary of State for the Home Department whether, seeing that the report of the Chief Inspector of Factories showed that a larger number of deaths from lead poisoning occurred in 1922 than in any previous year since 1900, what steps he proposed to take in order to put an end to the loss of life in the industries concerned.—Mr. HENDERSON replied: I presume the hon. Member refers only to the pottery industry. In no other industry was there a larger number of deaths from lead poisoning in 1922 than in any previous year since 1900. The hon. Member must not take the number of fatal cases from lead poisoning in 1922 as affording any indication of present conditions. In most fatal cases the disease has been contracted a long time previously, and as the hon. Member will find from the particulars of the 1922 cases, which will be circulated with the official report, the deceased had, in practically every instance, been employed for a long period of years in the industry. In fact, with few exceptions, the period of employment was not less than 20 years, and in two cases the worker had ceased to be employed in the industry some years previously. After an exhaustive inquiry by a departmental committee a new code of regulations for the industry was brought into operation in 1913, and since then there has been a great reduction in the total number of cases. Every effort is being made to reduce the number still further, but the hon. Member may rest assured that the situation will be carefully watched.

Mr. EDMUND HARVEY asked the Secretary of State for the Home Department whether his attention had been called to the fact that out of the 42 cases of lead poisoning notified in 1922 among workers in the manufacture of china and earthenware 17 were fatal; and whether he could give the ages and sex of those who died and state on what processes they were employed.—Mr. HENDERSON replied: The numbers stated in the question are those given in the report of the Chief Inspector of Factories for 1922. The following are the particulars asked for, together with the duration of the worker's employment in the industry:—

| Case No. | Sex. | Age. | Duration of employment. | Process. |
|---|---|---|---|---|
| 1 | M. | 51 | 35 years. | Glost placer. |
| 2 | M. | 44 | 31 ,, | Dipper. |
| 3 | M. | 53 | Over 20 ,, | Glost placer. |
| 4 | M. | 44 | Not worked since 1916. | ,, ,, |
| 5 | M. | 43 | 28 years. | ,, ,, |
| 6 | M. | 58 | 29 ,, | ,, ,, |
| 7 | M. | 51 | 30 ,, | Dipper. |
| 8 | M. | 60 | 41 ,, | Glost placer. |
| 9 | M. | 60 | 46 ,, | ,, ,, |
| 10 | M. | 40 | 20 ,, | Dipper. |
| 11 | M. | 55 | 37 ,, | Glost placer. |
| 12 | M. | 61 | Over 40 ,, | Dipper. |
| 13 | M. | 44 | 31 ,, | Glost placer. |
| 14 | M. | 42 | 16 ,, | ,, ,, |
| 15* | F. | 55 | 7 ,, | Dipper. |
| 16 | F. | 61 | 23 ,, | Aerographer. |
| 17 | F. | 46 | Not worked since 1904. | Warecleaner. |

* Died of cancer of the stomach accelerated by lead poisoning.

*Assaults on Children.*

Sir THOMAS BRAMSDON asked the Secretary of State for the Home Department if he had received copies of resolutions, passed by various organisations and public bodies with reference to assaults upon children, calling attention to the inadequate sentences passed on offenders, and to the need for an investigation; and whether, in order to lessen the number of these offences, he would appoint a departmental committee with wide terms of reference, including medical and legal experts, social workers, and representative women, to inquire into the whole subject.—Mr. HENDERSON replied: My attention has been called to this matter, and I have arranged that a conference shall be held at the Home Office when the whole question can be discussed. As at present advised I do not think that any useful purpose would be served by the appointment of a departmental committee.

*Pensions for Blind Ex-Soldiers.*

Lieut.-Colonel RUDKIN asked the Minister of Pensions if he was aware that there were many ex-Service men who had become blind since their discharge, but were not in receipt of any State aid; and whether he would give an opportunity for such cases to be sympathetically considered by his department, with a view to pension or other assistance.—Mr. F. O. ROBERTS replied: I am not aware of any cases of blinded ex-Service men, whose condition is either due to or aggravated by war service, who are not in receipt of pension from my department.

*Small-pox in England and Foreign Countries.*

Mr. BROAD asked the Minister of Health the number of cases of, and deaths from, small-pox reported in Germany, Japan, and England and Wales, respectively, during each of the years 1921, 1922, and 1923.—Mr. WHEATLEY replied: The following statement gives such particulars as are available, although the figures are not necessarily strictly comparable:—

| — | Number of— | 1921 | 1922 | 1923 |
|---|---|---|---|---|
| Germany .. .. | cases .. .. | 688 | 215 | 17* |
| | deaths .. .. | ? | ? | ? |
| Japan .. .. .. | cases .. .. | 889 | ? | ? |
| | deaths .. .. | 212 | ? | ? |
| England and Wales .. | cases .. .. | 336 | 973 | 2500* |
| | deaths .. .. | 5 | 27 | 7* |

* Provisional figures.

MONDAY, MARCH 10TH.

*Ship-breaking Workers.*

Mr. WATSON asked the Minister of Health if his attention had been drawn to the injurious effect of ship-breaking on the health of the workers engaged in that industry; if he was aware that the men engaged on the acetylene burners were only able to continue for a few weeks without breaking down; that in many cases no effective gas-masks or fresh milk was provided; and would he take steps to inquire into this matter and bring pressure to bear upon the ship-breaking companies to protect the health of their workers.—Mr. HENDERSON, the Home Secretary, replied: I have been asked by my right hon. friend to reply. The employment in question which has developed rapidly during the last two or three years has given rise to a number of cases of lead poisoning. It has been receiving the special attention of the Factory Department, and as a result of visits by the medical inspectors arrangements have now been made by the occupiers of practically all the yards for a periodic medical examination of the workers, this being, I am advised, the most practicable and effective precaution. It is hoped that these arrangements will prove effectual, but the situation will be carefully watched, and, if necessary, further measures will be considered.

*National Insurance Commission.*

Sir KINGSLEY WOOD asked the Prime Minister if he could announce the terms of the Royal Commission on National Insurance.—Mr. MACDONALD replied: The terms of reference have been drafted provisionally, but are not yet finally settled. A promise was given that before they were settled they should be shown to representatives of the medical profession and of the approved societies.

*Harnett v. Bond and Adam.*

Mr. COMYNS CARR asked the Prime Minister whether he had now come to a decision as to the promised inquiry into the questions of lunacy law and administration raised by the case of Harnett *v.* Bond and Adam; and whether he could now give an undertaking that the inquiry would not be held up pending the determination of possible appeals in that case to the Court of Appeal and the House of Lords.—Mr. COSTELLO asked the Prime Minister whether, when setting up the proposed body to inquire into the present lunacy laws and their administration, he would bear in mind the desirability of making the terms of reference to such body sufficiently wide to include an investigation into the internal administration and management of public and private institutions for the detention of lunatics, with special regard to their treatment and the conditions under which they received visitors and correspondence; and whether he would instruct such body to inquire into and report upon the feasibility of establishing hospitals to which doubtful cases might go for treatment, without unnecessarily incurring for themselves and their families the stigma of insanity.—Mr. MACDONALD replied: An application has been made to the Court of Appeal for an early hearing of this case, and the Court of Appeal have intimated their willingness to afford as early a hearing as possible. The application was made to prevent the possibility of embarrassment to any committee that may be appointed by reason of the Harnett case being still sub judice. In these circumstances it is not possible for me, at this moment, to give any undertaking such as is suggested, but the suggestions of Mr. Costello regarding the terms of reference will be borne in mind. Meanwhile the preliminaries to setting up the Commission are being proceeded with.

*Sheffield Hospital Scheme.*

Mr. CROOKE asked the Minister of Health if he was aware of the scheme by which the Sheffield hospitals were run by a joint council, with the result that the institutions were now self-supporting; and whether he would institute an inquiry into the working of this scheme in order to facilitate its adoption in other municipalities, in view of the financial difficulties at present obtaining in most hospitals.—Mr. GREENWOOD replied: The Sheffield Joint Hospitals Council are not responsible for the administration of the voluntary hospitals in their area, but my right hon. friend is aware of the admirable work done by the council in organising the systematic collection of weekly contributions. It is not necessary to institute any inquiry into the working of the Sheffield scheme, as this is already well known among hospital authorities. The adoption of this or other schemes of mass contribution in other areas is a matter for local decision, but my right hon. friend is glad to learn that the question has been engaging the attention of many local voluntary hospital committees.

*Future of Convalescent Centre.*

Mr. HENDERSON asked the Minister of Pensions if he would state the number of trainees who had been discharged since Jan. 1st, 1924, from the Prince of Wales's Convalescent Centre, Barry, South Wales; whether he would suspend all further discharges; and whether he would give an assurance that this centre was not to be closed.—Mr. F. O. ROBERTS replied: The number is 120. As I have already stated the future of this centre is under consideration, but discharges must necessarily continue as the men complete their courses of treatment and training.

TUESDAY, MARCH 11TH.

*Sulphuric Ether.*

Mr. LORIMER asked the President of the Board of Trade if he would state the number of gallons of sulphuric ether imported into this country during 1923, and the number of gallons produced in Great Britain during the same period.—Mr. SIDNEY WEBB replied: The total quantity of sulphuric ether registered as imported into the United Kingdom during the year 1923 was 16 gallons. This quantity is inclusive of direct imports, if any, into the Irish Free State up to March 31st of the year in question. I am not in a position to state the quantity of sulphuric ether produced in the United Kingdom during the past year.

# The Services.

## ROYAL NAVAL MEDICAL SERVICE.

D. Glass to be Surg.-Lt.

Surg. Comdr. G. E. Duncan is placed on the Ret. List, with the rank of Surg. Capt.

Surg.-Lt. (Emergency) R. R. Baker is reinstated on Active List as Surg.-Lt.

Surg.-Lt. J. R. Brennan to be Surg. Lt.-Comdr.

## ROYAL ARMY MEDICAL CORPS.

Lt.-Col. H. Rogers retires on ret. pay.

Maj. and Bt. Lt.-Col. W. F. Ellis to be Lt.-Col.

Capt. T. R. Snelling retires, receiving a gratuity.

### TERRITORIAL FORCE.

Maj. (Prov.) A. R. Moodie is confirmed in his rank.

Capt. C. Douglas to be Maj. (Prov.).

Capts. F. Harvey, D. L. Wall, and R. L. Williams, having attained the age limit, are retd., and retain the rank of Capt.

G. H. R. Gibson (late Canadian Army Med. Corps) to be Capt.

Lt. A. H. Richardson to be Capt. (Prov.).

## ROYAL AIR FORCE.

R. H. Stanbridge is granted a short service commission as a Flying Officer.

Flight Lt. J. C. T. Fiddes is transferred to the Reserve, Class D.2.

# Medical Diary.

## SOCIETIES.

ROYAL SOCIETY, Burlington House, Piccadilly, W.

THURSDAY, March 20th.—4.30 P.M., *Papers to be read:* Sir Charles Sherrington, P.R.S., and E. G. T. Liddell: Reflexes in Response to Stretch (Myotatic Reflexes). R. Campbell Thompson: The Plants of the Assyrian Medical Tablets. (Communicated by W. B. Hardy, Sec. R.S.)

**ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.**

*MEETINGS OF SECTIONS.*

**Tuesday, March 18th.**

GENERAL MEETING OF FELLOWS: at 5 P.M.
Ballot for election to the Fellowship (names already circulated.)

PATHOLOGY: at 8.30 P.M.
*Annual General Meeting.*
Election of Officers and Council for 1924–25.
*Demonstrations:*
W. D. Newcomb: Cutaneous Dissemination in Carcinoma of the Breast.
Nathaniel S. Lucas: (1) A Spleen and Liver from an Ocelot suggestive of a Leukæmic Condition; (2) An Unusual Form of Avian Nephritis; (3) An Angioma from the Liver of a Slender Dog.
*Papers:*
A. B. Rosher: The Effects of Inoculation of Heterologous Antigens on a Steady Agglutination Titre, with reference to the Diagnosis of Enteric in Inoculated Subjects.
V. F. Allison: Effect of the Administration of Vaccine on the Lysozyme Content of Tissues and Secretions.

**Wednesday, March 19th.**

HISTORY OF MEDICINE: at 5 P.M.
*Papers:*
Mr. J. E. H. Roberts: The History of Trusses.
Mr. George W. Corner: Earliest Western Anatomical Texts.

**Thursday, March 20th.**

DERMATOLOGY: at 5 P.M. (Cases at 4 P.M.)
*Cases* will be shown

**Friday, March 21st.**

ELECTRO-THERAPEUTICS: at 8 P.M.
*Discussion:*
On the Clinical Results of Deep X Ray Therapy, to be opened by Dr. Harrison Orton, followed by Dr. William Mitchell (Bradford). Mr. Sampson Handley, Dr. Woodburn Morison (Manchester), Dr. Hope Fowler (Edinburgh), Dr. George Cooper (Leeds), Dr. Robert Knox, and Dr. Reginald Morton will take part.
N.B.—The X ray department of the Institute of Anatomy, University College, Gower-street, W.C. 1, will be open for inspection in the afternoon.

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MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square, W. 1.
MONDAY, March 17th.—9 P.M., Dr. R. A. Young: The Treatment of Pulmonary Tuberculosis. (Third Lettsomian Lecture.)

HARVEIAN SOCIETY OF LONDON.
THURSDAY, March 20th.—8.30 P.M., Meeting at Paddington Town Hall, Prof. J. E. Frazer: Annual Harveian Lecture.

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE.
THURSDAY, March 20th.—8.15 P.M., a Laboratory Meeting will be held at the Royal Army Medical College, Grosvenor-road, Millbank, S.W. The following, amongst others, will give Demonstrations: Lieut.-Colonels S. P. James, W. P. Macarthur, and H. Marrian Perry; Drs. J. G. Thomson, Broughton-Alcock, and C. M. Wenyon; I. M. Puri, M.Sc., and L. G. Saunders, M.Sc., of the Molteno Institute, Cambridge (by permission of Prof. G. H. F. Nuttall). Dr. Andrew Balfour, C.B., C.M.G., will show a Cinematograph Film—lent by the Rockefeller International Health Board—illustrating the Ætiology, Spread, and Prevention of Malaria.

MEDICO-LEGAL SOCIETY, 11, Chandos-street, Cavendish-square, W. 1.
TUESDAY, March 18th.—8.30 P.M., Dr. Percy B. Spurgin and Sir Bernard Spilsbury: Cases of Sudden Death from Inhibition and their Medico-Legal Bearings.

## LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.
TUESDAY, March 18th.—5 P.M., Lieut.-Colonel Glen Liston, C.I.E.: The Plague. (Last Milroy Lecture.)

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION.
MONDAY, March 17th, to SATURDAY, March 22nd.—BETHLEM ROYAL HOSPITAL. Course in Psychological Medicine. Tues. and Sat., 11 A.M., Dr. Thomas Beaton and Dr. Porter Phillips: The Psychoses.—CHELSEA HOSPITAL FOR WOMEN. Daily: Operations, &c. Mon., 2 P.M., Mr. Rivett: Affections of the Vulva. Tues., 5 P.M., Mr. Bonney: Symptoms produced by Pelvic Displacement. Wed., 2 P.M., Mr. Dodd: Salpingitis. Thurs., 2 P.M., Mr. Giles: Plastic Operations demonstrated in Modelling Clay. Fri., Mr. Comyns Berkeley: Operations.—ROYAL FREE HOSPITAL. Wed., 5.30 P.M., Dr. Heald: The Direct Current especially in Relation to Fractures and Injuries.—ROYAL WATERLOO HOSPITAL. Lecture-Demonstrations, Ward Work, &c. Mon., 2 P.M., Dr. Woodwark; 3 P.M., Dr. Barron; 4 P.M., Dr. Donaldson. Tues., 2 P.M., Dr. Moon; 3 P.M., Dr. Myers; 4 P.M., Dr. Davidson. Wed., 1.30 P.M., Mr. Cairns Forsyth. Thurs., 1.30 P.M., Dr. Perkins; 2.30 P.M., Mr. Bickerton; 3.30 P.M., Dr. Tindal-Atkinson. Fri., 1 P.M., Dr. Lyle Cameron; 2 P.M., Dr. R. J. Perkins; 4 P.M., Mr. Beevor. Sat., 9.30 A.M., Mr. Frankau (Operations). Further particulars can be obtained from the office, 1, Wimpole-street, W. 1.

WEST LONDON POST-GRADUATE COLLEGE, West London Hospital, Hammersmith, W.
MONDAY, March 17th.—10 A.M., Surgical Registrar: Surgical Pathology. 12 noon, Mr. Sinclair: Surgical Diseases of the Abdomen. 2 P.M., Mr. Addison: Surgical Wards.
TUESDAY.—12 noon, Dr. Burrell: Chest Cases. 2 P.M., Mr. Banks-Davis: Throat, Nose, and Ear Dept. 2 P.M., Mr. Tyrrell Gray: Surgical Wards.
WEDNESDAY.—10 A.M., Dr. Saunders: Medical Diseases of Children. 12.15 P.M., Dr. Burnford: Medical Pathology. 2.30 P.M., Mr. Donald Armour: Surgical Wards.
THURSDAY.—10 A.M., Dr. Grainger Stewart: Neurological Dept. 12 noon, Mr. Simmonds: Demonstration of Fractures. 2 P.M., Dr. Scott Pinchin: Medical Out-patients.
FRIDAY.—10.30 A.M., Dr. Pritchard: Medical Wards. 2 P.M., Dr. Burrell: Medical Out-patients. Mr. Sinclair: Surgical Out-patients.
SATURDAY.—9.30 A.M., Dr. Burnford: Bacterial Therapy. 10 A.M., Dr. Saunders: Medical Diseases of Children. 10 A.M., Mr. Banks-Davis: Operations on Throat, Nose, and Ear.
Daily, 10 A.M. to 6 P.M., Saturdays, 10 A.M. to 1 P.M., In-patients, Out-patients, Operations, Special Departments.

HOSPITAL FOR SICK CHILDREN, Great Ormond-st., W.C.
WEDNESDAY, March 19th.—5 P.M., Prof. E. Gorter, of Leiden: The Pathogenesis of Certain Nutritional Disorders. (University of London Lecture in English.)
THURSDAY.—4 P.M., Dr. Cockayne: Mental Deficiency.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital.
(At 4.30 P.M.)
MONDAY, March 17th.—Dr. S. Cochrane Shanks: The X Ray Examination of Joint Conditions.
TUESDAY.—Dr. F. G. Crookshank: Treatment of Acute Pneumonia.
WEDNESDAY.—Dr. J. Browning Alexander: Pulmonary Fibrosis.
THURSDAY.—Mr. W. E. Tanner: Fractures of the Forearm and Elbow.
FRIDAY.—Dr. Jenkins Oliver: Some Skin Diseases of Infancy and Early Childhood.

NATIONAL HOSPITAL FOR THE PARALYSED AND EPILEPTIC, Queen-square, Bloomsbury, W.C. 1.
POST-GRADUATE COURSE: FEBRUARY–MARCH, 1924.
CLINICAL LECTURES AND DEMONSTRATIONS.
MONDAY, March 17th.—2 P.M., Out-patient Clinic: Dr. Hinds Howell. 3.30 P.M., Disseminated Sclerosis: Dr. Birley.
TUESDAY, March 18th.—2 P.M., Out-patient Clinic: Dr. Grainger Stewart. 3.30 P.M., Cervical Rib: Mr. Armour.
THURSDAY, March 20th.—2 P.M., Out-patient Clinic: Dr. Kinnier Wilson. 3.30 P.M., The Neuroses: Dr. Hinds Howell.
FRIDAY, March 21st.—2 P.M., Out-patient Clinic: Dr. Gordon Holmes. 3.30 P.M., Demonstration of Ward Cases: Dr. Grainger Stewart.
COURSE OF LECTURES AND DEMONSTRATIONS ON THE PATHOLOGY OF THE NERVOUS SYSTEM.
MONDAY, March 17th.—12 noon, Motor Neuron Disease: Dr. J. G. Greenfield.
The fee for the Course, including Pathology, is £5 5s. For those who hold Perpetual Tickets the fee is £3 3s.
COURSE OF LECTURES AND DEMONSTRATIONS ON THE NEUROLOGY OF THE EYES.
WEDNESDAY, March 19th.—3.30 P.M., The Trigeminal Nerve: Mr. Leslie Paton.
The Fee for this Course alone is £5 5s. If taken in conjunction with the general Post-Graduate Course the Fee is £3 3s. All applications should be sent to the Secretary, Medical School.
Mr. Armour and Mr. Sargent operate at the Hospital on Tuesday and Friday mornings at 9 A.M., or at such other times as may be announced.
Any part of the Course may be taken separately. Special arrangements will be made for those unable to take the whole Course.
Fees should be paid to the Secretary of the Hospital at the Office on entering for the Course.
J. G. GREENFIELD, Dean of Medical School.

CANCER HOSPITAL, Kensington, S.W.
WEDNESDAY, March 19th.—4.30 P.M., Sir James Dundas-Grant: Cases illustrating the Diagnosis and Treatment of Cancer of the Throat.

ST. JOHN'S HOSPITAL, 49, Leicester-square, W.C.
TUESDAY, March 18th.—5 P.M., Dr. Barber: Bacteriology of the Skin.
THURSDAY.—5 P.M., Dr. Sibley: Malignant Disease. (Chesterfield Lecture.)

MANCHESTER ROYAL INFIRMARY POST-GRADUATE LECTURES.
TUESDAY, March 18th.—4.15 P.M., Dr. A. E. Barclay: The Large Intestine from the Radiological Point of View.

ANCOATS HOSPITAL LECTURES.
THURSDAY, March 20th.—4.30 P.M., Dr. W. J. S. Reid: Rheumatism of Venereal Origin.

UNIVERSITY OF LIVERPOOL POST-GRADUATE LECTURES. (At 3.30 P.M.)
MONDAY, March 17th.—(At the Hospital for Women.) Dr. Willett: The Pelvic Peritoneal Crisis.
TUESDAY.—(At the Maternity Hospital.) Dr. J. W Burns: The Bleedings of Pregnancy.
WEDNESDAY.—(At the St. Paul's Eye Hospital.) At 3 P.M. Mr. Hayward Bywater: Glaucoma.
THURSDAY.—(At the St. George's Skin Hospital.) Dr. Barendt: Skin Cases.

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# Appointments.

DOWNING, ETHEL, M.R.C.S., L.R.C.P. Lond., has been appointed House Surgeon to the New Sussex Hospital for Women and Children, Brighton.
MACDONALD, J. B., M.B., Ch.B. St. And., Resident Medical Officer, East Poor House and Hospital and Ashcliffe Children's Home.
SMITH, H., M.R.C.S., L.R.C.P. Lond., Police Surgeon under the Leeds Corporation.
WILLIAMS, ENID A., L.R.C.P. & S. Edin., L.R.F.P.S. Glasg., D.P.H., Resident Medical Officer, Wolverhampton Poor-law Institution.
WOLFERSTAN, K., M.R.C.S., L.R.C.P. Lond., Certifying Surgeon under the Factory and Workshop Acts for Crewkerne.

# Vacancies.

*For further information refer to the advertisement columns.*

*Albert Dock Hospital, Connaught-road, Greenwich, E.*—H.S. £150.
*Barbados General Hospital.*—Jun. Res. S. £250.
*Bradford City.*—Bacteriologist and Pathologist. £750.
*Bradford Royal Infirmary.*—Three H.S.'s., H.P. Each £150.
*Brighton, Royal Alexandra Hospital for Sick Children.*—H.S. £120.
*Burntwood, near Lichfield, County Mental Hospital.*—Med. Supt. £1000.
*Buxton, Derbyshire, Devonshire Hospital.*—Asst. H.P. £150.
*Central London Ophthalmic Hospital, Judd-street, St. Pancras, W.C.*—H.S. £100. Jun. H.S. £50.
*Charing Cross Hospital, W.C.*—Asst. Obstet. P.
*Chester Royal Infirmary.*—Asst. H.S. £150.
*Coventry and Warwickshire Hospital.*—Res. H.S. £150.
*East London Hospital for Children and Dispensary for Women, Shadwell, E.*—Morning Cas. O. £120.
*Evelina Hospital for Children, Southwark, S.E.*—H.S. and H.P. Each £160.
*Federated Malay States, Central Mental Hospital.*—Asst. Med. Supt. £616.
*Greenwich, Dreadnought Hospital.*—H.S. and H.P. Each £150.
*Hastings, Royal East Sussex Hospital.*—Secretary. £500.
*Hospital for Sick Children, Great Ormond-street, W.C.*—H.S., H.P., and Asst. Cas. O. £50.
*Infants Hospital, Vincent-square, Westminster.*—Jun. Anæsthetist.
*Kensington Board of Guardians, Marloes-road Hospital.*—Temp. Asst. M.O. £7 7s. weekly.
*Leicestershire and Rutland Mental Hospital, Narborough, near Leicester.*—Second Asst. M.O. £350.
*Liverpool Eye and Ear Infirmary.*—Hon. Pathologist and Hon. Asst. Aural S.
*London Lock Hospital, 91, Dean-street, W.*—H.S. £200.
*Manchester Royal Infirmary.*—Hon. Asst. Aural S.
*Oxford, Radcliffe Infirmary and County Hospital.*—Hon. Asst. S.
*Prince of Wales's General Hospital, Tottenham, N.*—Two H.S.'s, H.P. Each £150. Jun. H.S. and Jun. H.P. Each £110.
*Queen's Hospital for Children, Hackney-road, Bethnal Green, E.*—Pathologist. £300. Also Asst. S.
*Redhill, Surrey, Royal Earlswood Institution.*—Jun. Asst. M.O. £250.
*Rochdale Infirmary and Dispensary.*—Jun. H.S. £200.
*Rotherham Hospital.*—Jun. H.S. £150.
*Royal Waterloo Hospital for Children and Women, Waterloo-road, S.E.*—Hon. P.
*Sheffield Royal Hospital.*—Res. Surg. O. £200.
*Warrington, Lancashire County Mental Hospital, Winwick.*—Asst. M.O. £440.
*West London Hospital, Hammersmith-road, W.*—One H.P. and Two H.S.'s. Each £100.
*Western Ophthalmic Hospital, Marylebone-road, N.W.*—Sen. and Jun. Non-Res. H.S.'s. £150 and £100 respectively.

The Chief Inspector of Factories, Home Office, London, S.W., announces a vacant appointment at King's Lynn, Norfolk.

# Births, Marriages, and Deaths.

## BIRTHS.

PARIS.—On Feb. 6th, at Quetta, India, the wife of Major R. C. Paris, R.A.M.C., of a daughter.

SUNDERLAND.—On March 3rd, at 1D, Hyde Park-mansions, London, N.W., the wife of Arthur Sunderland, M.R.C.S., L.R.C.P., of a daughter.

## MARRIAGES.

BARLOW—ROWNEY.—On March 4th, at St. Bartholomew-the-Great, Smithfield, Dr. Albert Malcolm Barlow to Dr. Eileen Susan Pears Rowney.

## DEATHS.

BROAD.—On March 8th, at The Sanatorium, Cardiff, Major B. W. Broad, M.B., C.M., Medical Superintendent.

DAVIES.—On March 8th, at Bryn-Newydd, Sketty, Glamorgan, David Arthur Davies, M.B. Lond., J.P., aged 75.

HAMMOND-SMITH.—On March 4th, at St. Albans-mansions, Kensington-court, W., Henry Hammond-Smith, L.R.C.P., M.R.C.S., aged 73 years.

LAWRENCE.—On March 8th, at Chepstow, Arthur Garnons Lawrence, M.D., in his 88th year.

NEW.—On the 9th March at a nursing home, of pneumonia, John Sherwood New, M.B., B.S., D.P.H., aged 53, Medical Officer of Health for Amersham, Bucks; Physician in charge Stoke Newington and St. Pancras Infants' Welfare Centres. Funeral from 245, Knightsbridge, S.W. 7. No flowers.

NEWBOLT.—On March 9th, suddenly, at his residence, 5, Gambier-terrace, Liverpool, in his 61st year, George Palmerston Newbolt, C.B.E., F.R.C.S., dearly loved husband of Lila Newbolt.

PARK.—On March 8th, at Rosedale, Torquay-road, Paignton, David Scott Park, J.P., F.R.C.S. Edin., &c., in his 80th year.

*N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.*

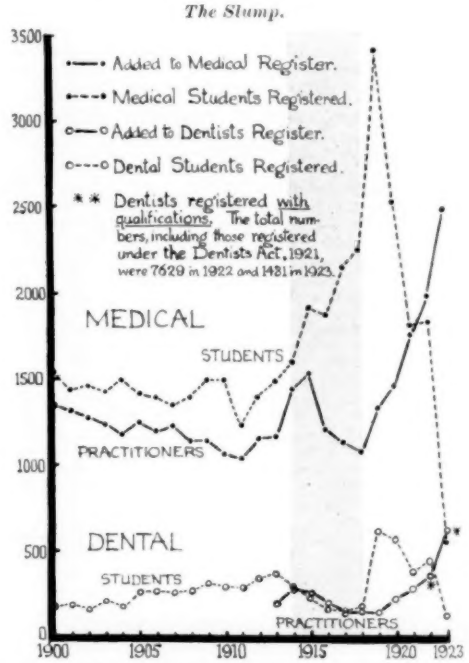
# Notes, Comments, and Abstracts.

## THE PORTAL OF MEDICINE.

### ENTRIES OF STUDENTS AND PRACTITIONERS IN 1923.

IN his presidential address to the General Medical Council in August, 1921, Sir Donald MacAlister pointed to the high tide of registration for medical study and expressed a misgiving whether the position had not been reached in which danger might arise to professional education, and perhaps to professional careers, from the mere number of students entering. That danger exists no longer, for the phenomenal rise in the entry of 1918–20 has been followed by a decline in numbers, alike without precedent. From the Medical and Dental Students Register, to which allusion was briefly made last week, it appears that the entry of medical students for 1923 was less than one-third of the entry for 1922. The same is true of the dental students except that a precedent for the small number can be found in 1887 and preceding years. The Medical and Dental Registers, on the other hand, show high-water marks in 1923 for professional registration, and these figures are likely to be maintained for another year or two. The accompanying graph based upon these figures sets out the situation and

*The Slump.*




The stippled band represents the period of hostilities, 1914–1918.

gives occasion for thought. While the drop in medical and dental entries may be nothing more than the trough succeeding the wave of the immediate post-war years, it must be due in some measure to the lessened entry of women students in particular. The latest report of the University Grants Committee—namely, for the year 1922–23—already shows a diminution of medical students to the number of 32 men and 246 women. Moreover, judging by the Christian names in the G.M.C. list of students, there are hardly more than 60 women among the total 545 medical entrants of 1923. The Grants Committee's report calls attention to the reasons which served to draw young men and women after the war to the medical schools and departments, but it does not foreshadow any such tremendous reduction in the entry as is shown by the 1923 figures. The diminution may have its root in economic conditions: possibly in a belief among parents that the medical profession is likely to be overcrowded or does not present a fair prospect of livelihood. No doubt the relatively high cost of the medical curriculum is a contributing factor.

## CENTENARY OF THE GLASGOW EYE INFIRMARY.

THE Glasgow Eye Infirmary began its work, albeit humbly, in June, 1824, and it will thus attain its majority, as one may say, in June, 1924. The founding of an eye hospital in Glasgow was first conceived by Dr. William Mackenzie, who circulated locally in January, 1824, a small pamphlet calling attention to the need for such an institution in the City, and he received enthusiastic support from another Glasgow surgeon, who had already established a considerable reputation in ophthalmology—Dr. George C. Monteath. After various preliminaries it was decided, at a public meeting with the Lord Provost in the chair, that an eye infirmary based on Dr. Mackenzie's suggestions should be established. The result was that a small house in a rather obscure lane almost in the centre of the city was opened in June, 100 years ago, for the care and treatment of sufferers from eye diseases.

The first surgeons were, as was to be expected, Mackenzie and Monteath, and it was arranged that each should take duty for a period of three months at a time and should attend at the infirmary three days a week. At first there was no special provision for operative treatment; the surgeons attended patients at their own homes and performed such operations as were needful there. In 1825 two beds for indoor patients were provided and a man and his wife were employed as nursing attendants. Subsequently two additional beds were supplied. In 1834 the premises at 19, Inkle Factory-lane (off North Albion-street) became too small and a house at 14, College-street (off High-street) was purchased. In this house ten patients could be accommodated, and the nursing staff remained as it was. In 1851 the work had increased to such an extent that premises of a better type became essential and the house in Charlotte-street was purchased. By 1874 continued growth had necessitated a further removal to the present buildings in Berkeley-street, and in 1886 an addition to the premises was completed.

There is now indoor accommodation for nearly 110 patients at Berkeley-street, as well as an out-patient department at which about 22,000 new patients attend each year. There is also an out-patient department in a new building erected in 1897 at Charlotte-street, where about 4000 new patients attend yearly. A branch of the eye infirmary has been opened at Clydebank for outdoor treatment of patients who reside in the neighbourhood of the shipyards and other works in that district. Thus the work began by Mackenzie has grown from small beginnings to very considerable proportions. The statistics of the Glasgow Eye Infirmary show that the amount of work done is great and it may be said that the state of the funds of the institution indicates that, after a hundred years of service, the public of the city recognises its merits.

Two or three little points in medical history may be noted. Tenotomy for squint was first performed in 1840 and depression for cataract was last performed in 1849. The epidemic of relapsing fever which raged in Glasgow about 1853 has left its mark in the statistics of the infirmary. Lastly, it is striking how great a decline there is in the proportion of cases of ophthalmia neonatorum to the total number of new cases. In 1840 it was nearly 1 in 10 and it gradually declined to 1 in 500.

In view of the celebration of the centenary a committee has been appointed to consider what form of memorial would most fittingly mark the occasion.

## A MEDICAL ACCOUNT BOOK.

WE have received a copy of Henry's Account Book,[1] which is designed for the use of members of the medical profession. If one is prepared to give the necessary time or attention to filling it up it will simplify many common difficulties and satisfy queries raised by the inspector of taxes. Whilst the headings used are suitable for ordinary purposes others might be required, and a little space more for extra blank columns would have been an improvement. This account book will be of value to medical men.

## PUBLIC HEALTH IN BRITISH HONDURAS.

THE estimated population of this colony on Dec. 31st, 1922, was 45,717 (males 22,688, females 23,029). The birth-rate for the year 1922 worked out at 39·059 per 1000, as compared with 35·456 in 1921, and the death-rate was 30·752 per 1000, as against 24·507 in the previous year. There was an alarming rise in the number of infant deaths. This was partly accounted for by an epidemic of whooping-cough. In the Orange Walk and Corozal districts the disease was very prevalent, and was of a virulent type, no less than 80 deaths in Corozal and 25 in Orange Walk having been certified as occurring from it. There were registered during the year in Belize (the capital) 9 deaths from malaria, the average mortality for the previous four years having been 12. The morbidity from this disease, which is naturally more difficult to estimate accurately, is, according to most of the medical practitioners in the town, on the decrease—a fact due probably to the increased precautions in carrying out the Mosquito Destruction Ordinance and the more efficient cleaning of yards. Two deaths were registered from tetanus neonatorum, as against an average mortality of 4 during the previous four years. It is hoped that, the new type of trained midwife now gradually taking the place of the older generation in Belize, this disease may before long be completely eradicated. Deaths from malaria showed a proportion of 6·7 per cent., from tuberculosis of 9·2 per cent., and from broncho-pneumonia of 10·6 per cent. of all the deaths registered. The climate of British Honduras has the reputation of being very unhealthy, but facts show that it compares not unfavourably with that of other tropical countries with small European populations, and that Europeans leading a normal life and taking common precautions find it pleasant and healthy. The highest rainfall registered in 1922 was at Punta Gorda in the Toledo district, which had a total of 151·19 inches and 192 days on which rain fell. The lowest rainfall was at Corozal, which had a total of 27·10 inches. The hottest day was May 14th, on which the thermometer registered 93·5° F., and the coldest day Jan. 14th, when it registered 56° F.

[1] Compiled by Mr. D. H. Rosen, 122, St. George's-road, Bolton; and printed by Messrs. Abel Heywood and Son, Manchester.

## FOR THE ASKING.

*To the Editor of* THE LANCET.

SIR,—May I ask through the medium of your columns whether a gift of three pairs of silk elastic stockings in quite good condition, though not new, would be useful either to an institution or to anyone interested in a deserving case? They were made to fit a female of middle height, and I should like to feel that they had gone where they were useful.

I am, Sir, yours faithfully,

March 11th, 1924. STOCKINGS.

## THE PROTECTION OF AIRCRAFT FROM INSECTS.

AN admirable little book,[1] illustrated with figures borrowed from well-known text-books, and designed for the use of officers and other Government servants in East Africa, has reached us. The subject-matter deals with tropical disease and insect transmitters and is clearly and well expressed: the instructions are direct and dogmatic. The second portion, written for the guidance of airmen in this country, describes the various kind of wood-boring insects liable to damage the wooden portions of an aeroplane and the means that should be taken to protect machines from this damage in East Africa. A useful map showing the range of tsetse-flies in the country is inserted at the end of the book.

*M. L. J.*—The remuneration of the locum-tenent is much the same now as it has been for some years past. In an average practice, whether in town or country, the lowest fee for a trustworthy tenent is 8 guineas a week, plus board, lodging, and travelling expenses. In the case of unusually large practices or in colliery or manufacturing districts 10 guineas may be paid. Advertisements offering services at less than the standard rate should be scrutinised with care.

[1] Hygiene and Disease in Eastern Tropical Africa—The Protection of Aircraft from the Attacks of Insects. Issued as a supplement to the handbook of German East Africa. Prepared on behalf of the Admiralty and the War Office. London: His Majesty's Stationery Office. 1923. Pp. 58. 2*s*.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